

# ***«Learning to Evaluate Movement Quality using Body Awareness Rating Scale – Movement Quality and Experience »***

A Comparison of Students' Observational Scores



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Word cloud composed of the students' qualitative descriptions of Sideways Movement in 2015

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Bergen, 15<sup>th</sup> of June 2017

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# **Learning to Evaluate Movement Quality using Body Awareness Rating Scale – Movement Quality and Experience (BARS-MQE)**

## **A Comparison of Students' Observational Scores**

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### **ABSTRACT**

*Background:* Observing movement quality is of particular importance within physiotherapy since movement quality reflects various health aspects. The ability to observe, describe, score and analyze movement quality is a skill, which requires experience and learning.

*Purpose:* The purpose of this investigation was to explore whether students of the international, post-graduate study programme in physiotherapy, Basic Body Awareness Methodology (BBAM), improved their ability to observe, describe and score movement quality after a year of studies, using the evaluation tool Body Awareness Rating Scale – Movement Quality and Experience (BARS-MQE).

*Methods:* Cross-sectional and longitudinal designs were used. 30 first-year students in BBAM evaluated movement quality in a video-recorded client, using BARS-MQE at the beginning (fall 2015) and after one year (fall 2016) of the BBAM study programme. A reference group of four skilled physiotherapists defined a “gold standard” of movement quality score. The curriculum of BBAM, based on conceptual, experiential and self-regulative knowledge, promoted the movement awareness learning process, and constituted the intervention in the study.

*Results:* The investigation found less variability and more concordance in observational scores after a study period of one year. The students also scored more similar to the reference group at the second evaluation, supporting validity of their BARS-MQE scores.

*Conclusion:* The BBAM students acquired better skills as a group in evaluating movement quality, in accordance with criteria of BARS-MQE, after a one year learning process.

*Key Words:* Movement Observation, Movement Analysis, Movement Quality, Movement Awareness Learning, Body Awareness Rating Scale, Basic Body Awareness Methodology.

# **Å lære å evaluere bevegelseskvalitet gjennom Body Awareness Rating Scale – Movement Quality and Experience (BARS-MQE).**

## **En sammenligning av studenters observasjonsskårer**

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### **SAMMENDRAG**

*Bakgrunn:* Å observere bevegelseskvalitet er spesielt viktig innen fysioterapi, da bevegelseskvalitet gjenspeiler ulike helseaspekter. Evnen til å observere, beskrive, skåre og analysere bevegelseskvalitet er en ferdighet som krever erfaring og undervisning.

*Hensikt:* Hensikten med denne studien var å utforske om studentene ved den internasjonale videreutdanningen i fysioterapi Basic Body Awareness Methodology (BBAM) forbedret sin evne til å observere og skåre bevegelseskvalitet under videreutdanningen når de brukte observasjonsskåringsskjemaet Body Awareness Rating Scale – Movement Quality and Experience (BARS-MQE).

*Metode:* Tverrsnitt og longitudinell design ble brukt. 30 førsteårsstudenter på BBAM evaluerte bevegelseskvalitet på et video-opptak av en klient ved å bruke BARS-MQE ved begynnelsen av studiet (høsten 2015) og etter ett år (høsten 2016). En referansegruppe bestående av fire erfarne fysioterapeuter fungerte som gullstandard på bevegelseskvalitetsskåringene. Læreplanen på BBAM er bygget på konseptuell- og erfaringskunnskap samt selv-regulerende kunnskap som er ment å fremme bevegelsesbevisstgjøring. Læringsprosessen utgjorde intervensjonen i studien.

*Resultat:* Resultatene fra studien viste mindre variabilitet og mer samsvar av observasjonsskåringene fra den første til den andre evalueringen. Studentene skåret også likere referansegruppen etter ett års studier, noe som støtter validiteten av BARS-MQE skåringene.

*Konklusjon:* BBAM studentene fikk som gruppe bedre sine ferdigheter å evaluere bevegelseskvalitet, i samsvar med BARS-MQE kriteriene, etter en læringsprosess på ett år.

*Nøkkelord:* Bevegelsesobservasjon, Bevegelsesanalyse, Bevegelseskvalitet, Bevegelsesbevisstgjøring, Body Awareness Rating Scale, Basic Body Awareness Methodology.

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# Abbreviations

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BBAM	Basic Body Awareness Methodology
BBAT	Basic Body Awareness Therapy
BARS-MQE	Body Awareness Rating Scale – Movement Quality and Experience
HVL	Høgskulen på Vestlandet (eng. Western Norway University of Applied Sciences)
ECTS	European Credit Transfer and Accumulation System
IATBBAT	International Association of Teachers Basic Body Awareness Therapy
MQ	Movement Quality
NSD	Norwegian Social Science Data Services
REC	Regional Committees for Medical and Health Research Ethics
UiB	University of Bergen

# Definitions in short

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Movement quality	An umbrella term embracing physical, physiological, psycho-socio-cultural and existential perspectives of human movement, expressed in diverse aspects or movement qualities (Skjærven, Kristoffersen, & Gard, 2008).
Movement Awareness	Sensitivity to multiple movement nuances, in relation to space, time and energy, identifying subtle movement reactions to internal and environmental conditions (Skjærven, 2015).
Tacit knowledge	Knowledge embedded in the human mind through experience, and includes intuitions, values and beliefs (Awad & Ghaziri, 2004, p. 47). Tacit knowledge is difficult to express.
Perception	The integration of sensory impressions into psychological meaningful information”(Shumway-Cook & Woollacott, 2001, p. 3). Perception appears as the most impoverished form of tacit knowledge as it forms a bridge from creative powers to higher bodily processes (Polanyi, 1966).
Skill	Expression of experiential and practical knowledge (Kurunsari, Piirainen, & Tynjala, 2015). Execution of a task with a clear purpose as a result of learning. The person performing the task must have a clear intention with the task and a goal to produce a wanted result (Sigmundsson, 2008).

# 1 INTRODUCTION

## 1.1 Background

Movement is considered an essential element of health and well-being (World Confederation for Physical Therapy, 2011). Observing, describing and evaluating movement and function, and guiding the patients' in core movement elements and aspects, are considered the primary roles of the physiotherapist within treatment, rehabilitation and preventive health care (Skjærven et al., 2008). Traditionally, a physiotherapist is educated to diagnose and manage movement dysfunction (American Physical Therapy Association, 2003), focusing on impairment of musculoskeletal, neuromuscular and cardiopulmonary systems of the body (Covington, 2015). Clinical examination is structured to observe and assess these different systems. Solberg (2015) describes how traditional clinical examination established as a norm, provides him with useful information about asymmetrical movement pattern, drop foot, limping, fixation of joints or other dysfunctions. The attention is in other words on body parts and dysfunction. Also, the physiotherapist is primarily trained to examine one joint at the time, not as the whole body as a coordinated system.

I acknowledge the information provided by a traditional clinical observation. However, being a former dancer, movement expression and integration of movement quality has always been of particular interest to me. As a physiotherapist, I have been fascinated by the vital information provided from movement as a total coordination. I am intrigued by the possibility of observing health in movement, and of how health can be expressed and promoted through movement. According to Moore and Yamamoto (2012) will an altered relationship between observing moving body parts opposed to observing movements with a clear intention and goal, affect our ability to see meaningful wholes. They compare this with listening too keen to individual notes and chords of a tune, as possibly leading to failure of hearing the melody. When observing movements, the elements must be perceived subsidiary to the whole if they are to make sense. As Polanyi opines, "all particulars become meaningless if one loses sight of the pattern which they jointly constitute" (1962, p. 57).

Basic Body Awareness Therapy (BBAT) is an important modality in my physiotherapy practice. BBAT builds on the hypothesis that mental state and stressors may compromise a person's awareness of the physical body, the internal psychological life, the physical environment and the relationship to other people (Dropsy, 1987; Olsen & Skjærven, 2016). Decreased movement awareness can be expressed in poor balance, blocked breathing, dysfunctional movements, and compensatory movement strategies (Skjærven, Gard, Sundal, & Strand, 2015), which affect the movement quality. A general and overarching therapeutic objective in BBAT is to facilitate change through a movement awareness strategy to promote movement quality (Skjærven, 2003). BBAT was inspired by the French movement educator and psychotherapist Jacques Dropsy, brought into physiotherapy by Gertrud Roxendal, and has further been elaborated in the Scandinavian countries by the International Association of teachers in BBAT (IATBBAT) during the last thirty years (Skjærven, Kristoffersen, & Gard, 2010).

The BBAT movement awareness learning programme includes everyday movements in lying, sitting, standing and walking, relational movements, use of the voice and massage (touch). The therapy can be organized as individual and/or in group therapeutic settings. Reflective talk and sharing of experiences and issues raised in the therapy sessions are integrated in BBAT (Skjærven et al., 2010). The movements are developed from three basic co-ordinations a) flexion/extension, b) turning around the vertical axis and c) turning/counter turning, involving the whole moving person from sole of the feet to top of the head and centre to periphery (Dropsy, 1983). The movement coordinations are a result of how a person relates to the ground, to the vertical axis, to the breathing and the movement centre.

Attention to the three core elements balance/postural stability, free breathing and awareness, whilst being in movement, is used by the physiotherapist to promote movement quality and movement awareness learning, and is regarded as a precondition for the client to (re-)gain more functional movement quality. Integration of the core elements and level of unity, expressed in movement aspects are also important for the therapist when observing and evaluating movement quality (Skjærven, 2015, p. 19).

Movement quality can be observed, described and quantified through criteria developed for the evaluation tool, Body Awareness Rating Scale – Movement Quality and Experience (BARS-MQE). BARS-MQE was initially developed by Skatteboe and Friis for patients within mental health and long-lasting musculoskeletal problems. BARS-MQE consists of two evaluation parts: (i) the physiotherapist's observation, description and scoring of movement quality based on the 12 movement items and (ii) the physiotherapist's interview with the patient about immediate movement experience after exploring each movement. The tool has been further elaborated by Skatteboe/Skjærven, and Skjærven/Sundal (Skjærven et al., 2015). The two evaluation parts are supported by factor analysis (Ulla Britt Skatteboe, 2000; U.B. Skatteboe, Friis, Hope, & Vaglum, 1989).

BARS-MQE is designed to determine the therapeutic intervention, as well as to evaluate effects of the therapy. BARS-MQE is (1) process-oriented, (2) person-centered and (3) health-directed (Skjærven et al., 2008, 2010). This implies that the physiotherapist (1) guides the patient and gives time to develop movement quality while *being* in the movement, and (2) observes the whole moving person's dynamic interplay between the core elements of postural balance, free breathing, and mental awareness, concerning how the patient moves in relation to time, space and energy. The physiotherapist emphasizes (3) the healthy movement resources, and scores the most functional movement quality observed. As the evaluation of movement quality is based on observing the whole moving person, it is hypothesized that movement elements and aspects observed, to some degree is associated with perceived wellbeing, general health and self-efficacy, as indicated in a previous study (Skjærven et al., 2015).

Even though movement is considered an essential element of health, and an important aspect of physiotherapy, practical and experiential knowledge of the phenomenon of movement quality being an expression of a person's movement awareness is not given much attention in physiotherapy education (Skjærven et al., 2010). According to Higgs,

Richardson, and Dahlgren (2004) a major reason for this is the lack of value placed on the practical and experiential knowledge, and the difficulty of making this knowledge explicit.

Several studies have investigated the importance of movement within physiotherapy education, in order to educate skilled physiotherapists. According to Covington (2015) it remains unclear how teachers promote the use of movement as a vital component of student practice. He investigated how clinical physiotherapy teachers perceive and facilitate their students' use of movement in practice in order to promote patient outcome. Svensen and Bergland (2007) on the other hand, investigated whether learning through the body could promote important qualities in the physiotherapist. This study revealed how empathy seems to organize perception, promote awareness of self and others, and increase sensitivity towards what is observed, and promote respect. Ahola, Piirainen, and Skjærven (2017) designed a phenomenographic study directed towards how students acquire awareness of own movement quality and form conceptions of movement quality. They found that "being in contact with one's own movement is the precondition for connecting and understanding the movement quality at a more professional level" (Ahola et al., 2017, p. 67). An inclusion of the knowledge of movement in education will as Brown (2013, p. 34) points out: "... not seek to diminish the rich academic and scholarly work of anatomy, skill acquisition, and exercise physiology that have provided important knowledge to physical education practice, curriculum development and pedagogical practice".

Implementing BBAT's principles one aims to promote movement awareness through movement quality and convert tacit knowledge of movement awareness expressed in the person's movement quality, into explicit knowledge. The experiential knowledge and practical skill of evaluating movement by observing, describing and scoring movement quality must hence be learnt and practiced in order to provide reliable scores on BARS-MQE, being the basis for clinical reasoning in BBAT. In this project, pedagogical strategies and educational frames for acquiring such knowledge will be presented as a background for the comparison of students' observational scores.

Basic Body Awareness Methodology (BBAM) is an international post-graduate physiotherapy study programme, founded in 2003 at Western Norway University of Applied Sciences. BBAM is built on Basic Body Awareness Therapy, BBAT. The study programme is designed for physiotherapists who want to gain knowledge and skills from a multi-dimensional approach of human movement. The programme is developed for physiotherapists who work with patients with multifactorial problems, and BBAT has been found beneficial for patients suffering from long-lasting musculoskeletal pain, fatigue, fibromyalgia and various psychiatric disorders (Catalan-Matamoros, Skjaerven, Labajos-Manzanares, Martinez-de-Salazar-Arboleas, & Sanchez-Guerro, 2011; Danielsson, 2015; Gard, 2005; Johnsen & Råheim, 2010; Steihaug, Ahlsen, & Malterud, 2002).

The BBAM study programme aims towards that the students' acquirement of the skill of observing, describing, and scoring when evaluating movement quality. This research study is concerned with the process of learning to evaluate movement quality of the whole moving person in connection with BBAM, using BARS-MQE as the evaluation tool and a basis for clinical reasoning and health promotion.

## **2 THEORY**

### **2.1 Observation, seeing and perception**

Observation is an important skill that students learn in BBAM. I will define the concept in relation to seeing and perception. The verb “observe” can be used in two ways. It can be used to describe the act of examining something by looking, listening, smelling, feeling etc. A different use of the verb is to fulfil or comply with an obligation, to recognize and accept. This explorative process is described by the use of verbs indicating perception like seeing, hearing, detecting etc. (Dictionary, 2017).

According to Berger (1972) seeing comes before words – “the child looks and recognizes before it can speak”. How we see things is affected by prior knowledge or assumptions. Own bodily experiences are exchanged with the perception of the things outside (Polanyi, 1966, pp. 13-14). Prichard (1950) describes seeing a moving body as a process, state or activity with specific character, and distinguishes it from judging. Seeing is different from looking. Seeing another object or person is determined by our awareness of certain efforts. Hatfield (2009) supports this view by describing how we see through phenomenal experience. We are aware of the phenomenal experiences or efforts inside our body in terms of position, shape, and motion of an object. Perception as tacit knowledge, is hence a valuable source when learning to observe movement quality in BBAM, and is learnt through practice: Through movement and by *being in* movement (Polanyi, 1966).

### **2.2 Background and rationale for the pedagogy at the study programme of BBAM**

Through theoretical, experiential and reflectional learning, the students at the BBAM study programme are expected to acquire certain components of knowledge necessary to the development of observational skills. The following chapter concerns knowledge aspects



considered important to learn, in order to evaluate movement from a multi-dimensional perspective.

Knowledge has traditionally been separated into two basic categories: Practical or embodied knowledge and theoretical/intellectual knowledge. These two types of knowledge are complementary, neither is present without the other, and both are mediated through the body (Duesund, 2001; Kurunsari et al., 2015). Polanyi (1966) refers to two different meanings of “knowing” in the German language; “wissen” (knowing that), and “können” (knowing how). In his understanding, “wissen” means experience based knowledge of a static and intellectual character, easily transferred by words. “Können” refers to practical or embodied knowledge of dynamic character, not as easily transferred by words, but rather transferred through i.e. observation of an expert. Polanyi (1966) used the term knowing to cover both practical and theoretical knowledge, and defined knowledge as an activity, or a “process of knowing”.

Polanyi defined the concept of knowledge or knowing based on three main theses: 1. True discovery cannot be accounted for by rules; 2. Knowledge is public and personal – as it is constructed by humans and therefore contains emotions. Knowledge is thus not private but social. 3. The knowledge, which underlies the explicit knowledge, is more fundamental: All knowledge is either tacit or rooted in tacit knowledge. Both tacit and explicit knowledge are action oriented (Sveiby, 1996, p. 379).

Recent scientists describe knowledge through four components: 1. Conceptual knowledge; 2. Experiential and practical knowledge; 3. Self-regulative knowledge; and 4. Socio-cultural knowledge (Tynjala & Gijbels, 2012). I will shortly present these components as they are considered relevant for the skill acquisition of evaluating movement quality using BARS-MQE.

### **2.2.1 Conceptual knowledge**

Conceptual knowledge is explicit knowledge codified and digitized in books, documents and similar, and can easily be retrieved and transmitted to others (Awad & Ghaziri, 2004). Stored as i.e. written procedures or as a process it becomes reusable. Conceptual knowledge includes declarative knowledge as it is theoretical in nature (Kurunsari et al., 2015). In the BBAM curriculum there are 4000 pages of compulsory literature given by HVL. Some of these are directed towards BARS-MQE and BBAT movements. When knowledge is articulated into words one could say the tacit knowledge has become explicit knowledge through language. The knowledge may at this point be an object of reflection. The knowledge is also possible to distribute, criticize and thereby increase (Sveiby, 1996, p. 380). However, it is important to notice that language alone is not sufficient to make knowledge explicit, comprehension is a precondition (Sveiby, 1996).

### **2.2.2 Experiential and practical knowledge**

Experiential and practical knowledge finds its “expression in skills and psychomotor experience”, according to Kurunsari et al. (2015, p. 261). This experiential knowledge, including intuitions, values and beliefs is often tacit (Awad & Ghaziri, 2004, p. 47). Polanyi (1966, p. 4) explains this embedded knowledge by the fact that “we can know more than we can tell”. Tacit knowledge is difficult to express, and to share across time and space (Awad & Ghaziri, 2004). As tacit knowledge is stored in the human mind it is vulnerable to loss. However when tacit knowledge is shared and conceptualized, vulnerability is reduced and the knowledge is easier to reuse (Awad & Ghaziri, 2004, p. 47). Experiential knowledge provides the BBAM students with skills of movement awareness and skills of observing, describing and evaluating movement quality.

### **2.2.3 Self-regulative knowledge**

This component of knowledge has to do with the skill of self-knowledge and the ability to regulate and reflect upon own activities and actions. Metacognition (the ability to observe yourself, others and the environment from a more distanced perspective) and self-reflection of thoughts, emotions and actions, are the expressions of this form of knowledge (Tynjala & Gijbels, 2012).

Svensen and Bergland (2007) pointed to the fact that experiences arise on a pre-linguistic level, but reflexivity through verbalization of bodily experiences is a strategy to learn empathy and increase the possibility of understanding others. The importance of reflexivity through verbalization is reinforced by Sviland, Råheim, and Martinsen (2009) describing how language creates a room of understanding and freedom of thoughts, and the awareness of understanding follows self-awareness. Ahola et al. (2017) describes reflection as a strengthening of own professional development, and becomes hence an important skill to acquire when learning to evaluate movement quality. The reflective talk and sharing of experiences is an integrated part of BBAT. It is of great importance when it comes to promoting movement awareness and movement resources – also when guiding a client through BARS-MQE.

### **2.2.4 Socio-cultural knowledge**

The three basic components of knowledge described above (i.e. conceptual, experiential and self-regulative) is personal and individual knowledge. However, as Polanyi points out, besides being personal, knowledge is also public and social (Sveiby, 1996). Socio-cultural knowledge can be experienced through participation in these environments, using the tools and devices that they provide (Kurunsari et al., 2015). The educational frames of BBAM provide a context for experiencing socio-cultural knowledge.

## 2.3 Skill – learnt practical knowledge

According to Pedersen (Sigmundsson, 2008) the concept skill is used to describe the execution of a task with a clear purpose, and is a result of learning. The person performing the task must have a clear intention with the task and a goal to produce a wanted result. The students of BBAM need to learn several skills to evaluate movement quality using BARS-MQE, and the skills build on conceptual, experiential, self-regulative and socio-cultural knowledge. Movement awareness expressed through movement quality is the essential object in BARS-MQE and generates knowledge for clinical reasoning. The student's personal process of evolving movement awareness is a precondition for observing, describing and recognizing movement quality (Skjærven et al., 2010).

According to Kurunsari et al. (2015, p. 261) "the concept of skill can be seen from three points of view, depending on traditions: 1. Ontological approach; 2. Epistemological question; or 3. Competence viewpoint".

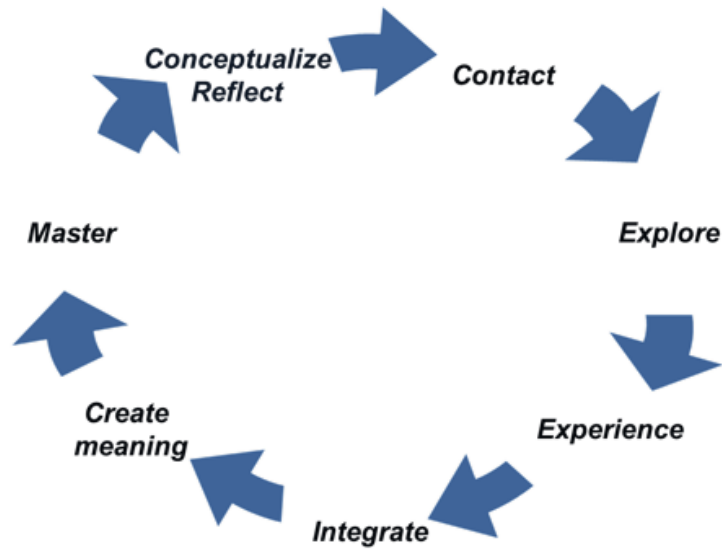
Developing a skill from an ontological approach, involves learning by being, doing and relating (Dropsy, 1983, 1987). In the BBAM and BBAT pedagogy this is an important action strategy in movement awareness learning. First to be in movement, training the presence to become aware of *how* the movement is done. Second, to conceptualize and reflect upon own experience. This becomes hence an important point of view when evolving the skill of movement awareness.

The epistemological viewpoint examines the concept of skill in relation to the concept of knowledge. This viewpoint considers knowledge as justified true belief. A competence viewpoint of skill acquisition is a pragmatic approach viewing knowledge and skills as qualifications acquired through education and practice (Kurunsari et al., 2015). The students of BBAM would need to develop different skills. I will in the coming text focus on skills from an ontological and competence viewpoint.

### **2.3.1 Movement awareness**

The physiotherapist's own movement awareness of and experience is found to be a precondition for observation, understanding and promotion of movement quality in the patient (Skjærven et al., 2015; Skjærven et al., 2010). Being able to listen to bodily signals, of how movements are performed and experienced, is a core aspect in a salutogenic perspective (Antonovsky, 1987). This is considered an important phase of movement observation. To develop the skill of being able to observe, describe and evaluate movement quality the students need to learn and evolve a sensitivity of own and others (i.e. their patients) movement awareness. Movement awareness can as such be defined as "sensitivity to multiple movement nuances, in relation to space, time and energy, identifying subtle movement reactions to internal and environmental conditions (...) These movement nuances are found along the continuum between healthy and pathological movement aspects" (Skjærven, 2015, p. 3). The evolved sensitivity of movement awareness expressed in movement quality could be considered the total sum of our perceptive processes and helps us to recognize health aspects, prior to clinical decision making. Movement awareness becomes hence an important skill to embody and evolve and embody for the BBAM students (Skjærven et al., 2010).

### 2.3.1.1 The Movement Awareness Learning Cycle



**Figure 1** The Movement Awareness Learning Cycle (Skjærven et al., 2010)

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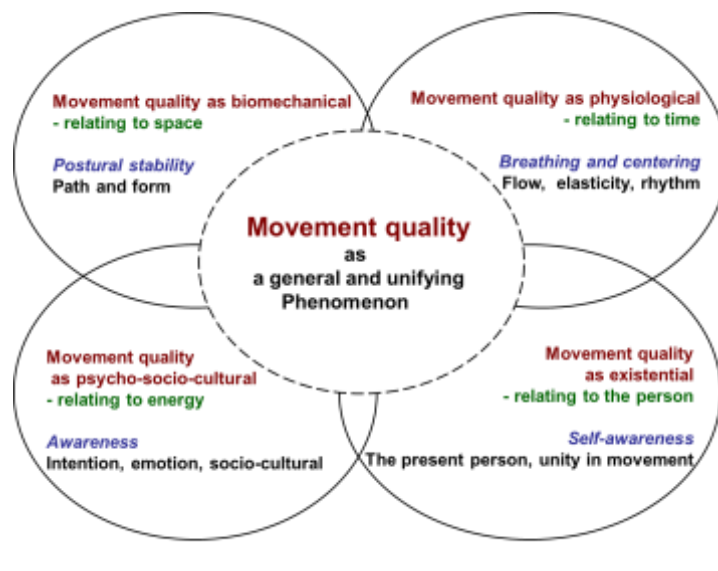
Movement Awareness Learning Cycle (Figure 1) is one of the therapeutic factors described for promoting movement awareness learning (Skjærven et al., 2010). As a physiotherapist, it is a precondition first to be present in his whole body and being attentive of his own movements in the very moment through being – you learn a “know-how”. Secondly the therapist learns to be aware how and what this communicates through movement. Being in movement is also considered as a facilitator in treatment and an important dimension of expert practice (Jensen, Gwyer, Shepard, & Hack, 2000). The therapist becomes a mirror or role-model for the patient, providing the patient with an internal image of movement quality, which otherwise can be difficult to find (Skjærven, 2015). Through movement the therapist facilitate existentials as lived space (spatiality, lived body (corporeality), lived time (temporality) and lived human relation (relationality or communality) (van Manen, 1990): All of these existentials are important to facilitate in patient prior to evaluating movement quality. In order for the students to evolve the skill of movement awareness, and refine a sensitivity of movement quality as a general and unifying phenomenon, as a precondition to

observe, describe and evaluate movement quality, the students themselves are in movement together with the teacher.

The first step of the Movement Awareness Learning Cycle is the establishment of *contact* with the body and its movements. The teacher creates an atmosphere of trust and acceptance in order for the students to *explore* and *experience* movements with all its characteristics. The teacher guides the students in this process, and facilitates an *integration* of the experiences and movement coordinations in order for the student to *create meaning*. This implies recognition of movement nuances, and discovering a connection between movement habits and every-day challenges. Implementing more healthy movement strategies in daily life, the student may experience a sense of mastering and a stronger self. Verbalization of movement experiences through *Conceptualization and Reflection* together with the physiotherapist is expected to strengthen the learning outcome from movement awareness practice and to promote the patient's resources.

### **2.3.2 Observing the phenomenon of movement quality**

In BARS-MQE, movement quality is observed, described and scored in accordance with specific criteria in two layers, as described in phenomenological research (Skjærven et al., 2008, p. 15). The first layer represents a general impression of the whole movement coordination of the body. In the second layer, a differentiation of elements and aspects of movement quality is made. Together, the two layers represent movement quality as an umbrella term embracing physical, physiological, psycho-socio-cultural and existential perspectives of human movement, expressed in diverse aspects or movement qualities. The Movement Quality Model in Figure 2 illustrates how movement quality can be described as a general and unifying phenomenon. It can be used as a map or stepwise structure for observing movement quality.



**Figure 2** Movement Quality Model (Skjærven et al., 2008)

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Preconditions for movement quality are the core elements of postural stability, breathing and centring, awareness and self-awareness, and how the three are integrated into movement (Skjærven et al., 2008). All core elements are necessary for the movement quality to be refined. The core elements are necessary for unifying the coordination of body and mind in movement in order to embody a sense of well-being (Skjærven, 2002).

When evaluating movement quality, the first step is to observe movement quality from a biomechanical perspective. The physiotherapist observes " how the person relates to space and how this relation affects the postural alignment and the path and the form of movement based on the anatomical structure of the body" (Skjærven et al., 2008, p. 22).

In the second step movement quality is observed from a physiological perspective and a psycho-socio-cultural perspective. The physiotherapist search to observe how the person relates to time and how this relation affects the flow elasticity and rhythm movement quality (Skjærven et al., 2008). Also, the physiotherapist observes the intention, attention and emotional movement aspects (Skjærven, 2015).



The third step of observing movement quality focuses on movement quality from an existential perspective. The physiotherapist observes the unity or level of integration, and the ability of the person of being present (Skjærven, 2015; Skjærven et al., 2008, p. 22).

In order to evolve the skill of observing movement quality and how movement awareness is expressed and experienced by the patient, the BBAM students need to experience, integrate, find meaning, conceptualise and reflect upon movement quality as a phenomenon in order to develop the skill of own movement awareness.

## **2.4 Experiential based learning theory**

An outline of relevant theoretical frames connected to experiential based learning in general, and specific movement learning in particular.

### **2.4.1 John Dewey's theory on education and learning**

John Dewey (1859-1952) was an American philosopher, psychologist and educational reformer. Dewey is considered one of the primary figures associated with the philosophy of pragmatism. Pragmatism originated as a theory of meanings: meanings of ideas should be applied in action, in order to predict practical bearings or effects (Skilbeck, 1970, p. 6).

The core of Dewey's educational theory builds upon the view of experience as a continuous interaction or transaction between an organism and its environment (Dewey, 1916).

Experience is primarily described as an active-passive affair. By experience as active he means trying and experimenting, whilst experience as passive is the response upon the experience, undergoing the consequences. Mere activity does not constitute experience. Experience as *trying* involves change, but change is meaningless unless it is consciously connected to the consequences, which flow from the experiment/exploration.

Development or growth cannot take place by direct conveyance of beliefs, emotions and knowledge (Dewey, 1916, p. 26). An individual may have experiences without being aware of them, but to become aware of the experiences, to reflect on it and evaluate the consequences and to find ways of recreating the experiences are according to Dewey indispensable conditions of growth (Skilbeck, 1970, p. 13). Learning from experience involves making a backward and forward connection between what we did – our actions – and what the consequence of the actions were.

Dewey emphasises the importance of not only knowing that there is a connection between doing, and what follows. He stresses the importance of analysing the connection. Analysing the details of a specific connection makes the experience explicit and the quality of the experience changes: The experience becomes reflective. Thinking, in other words, is the intentional endeavour to discover the specific connection, so that the connection between what we do and the consequences with a result, become continuous (Dewey, 1916, p. 170). In BBAM, the connection between doing and its consequences is established through assignments and reports of personal training, clinical practice, and monthly reflection papers made in movement practice at HVL. Verbalising and describing experiences through assignments and reports becomes an important part of the learning process.

#### **2.4.2 Arnold's concept of learning from movement**

Peter Arnold (1931-2010) was considered a sport philosopher. His work is often held as the “gold standard” in physical education and sport pedagogy curriculum design, and has influenced national curriculum ambitions across the western world from Canada, to New Zealand, Australia to the UK (Brown, 2013; Stolz & Thorburn, 2015). He articulated “...the place of movement in the curriculum” (Arnold, 1988), which is enacted via the concept of three dimensions of movement. According to Stolz and Thorburn (2015) Arnolds work was influenced by Dewey's work on progressive education – or student-centred education, and the notion that dynamic interactions between body and mind can play an important role in synthesising experiences in activity contexts.

Arnold (1979) was concerned with the fact that moving bodies possess an extraordinary ability to make meaning “about, through and in” movement. Arnold was hence an ambassador of implementing the concept of dimensions of movement in a curriculum theory framework. He was concerned with three dimensions of movement for the curriculum:

1. Education *about* movement
2. Education *through* movement
3. Education *in* movement

These dimensions interrelate, and cannot be separated from each other. This study concerns the learning process of the students, and I will in the following sections describe the dimensions from the students’ *learning perspective*.

#### **2.4.2.1 Learning about movement**

Learning *about* movement is mainly done through theoretical or conceptual knowledge, and is concerned with rational and propositional enquiries. Human movement is studied from anatomical, physiological, sociological or philosophical perspectives. Theoretical knowledge about movement is mediated through written or oral language. It is primarily objective and public, and is propositional and declarative (Brown, 2013). The knowledge is, however, depending upon meaning in order to be valid. Theoretical knowledge of movement practice is relevant in research and analysis of movement patterns. It is useful for the performance of the activity and enhances the performance of the movement activity (Duesund, 2001) – as the knowledge about movement can be used to critically analyse and evaluate movement experiences. The theoretical knowledge of movement is not a precondition for movement/activity to take place, the practice is rather the precursor of theory – as the movement is originated in the body (Duesund, 2001).

#### **2.4.2.2 Learning through movement**

This brings us to the second dimension in which movement can be learnt: By learning through movement. When you learn through movement you acquire practical knowledge. This dimension aims to develop extrinsic learning objectives through participation in selected and directed movement activities (Brown, 2013). There are two necessary aspects for the practical knowledge to be valid: The performance of movement activity, and the report or description of the movement activity. Arnold (1979) introduces in this setting the concept of the reflective practitioner (cited in (Duesund, 2007)). It is not sufficient to perform the movement activity; one needs to describe explicitly what has been implicitly performed (Duesund, 2001).

#### **2.4.2.3 Learning by being in movement**

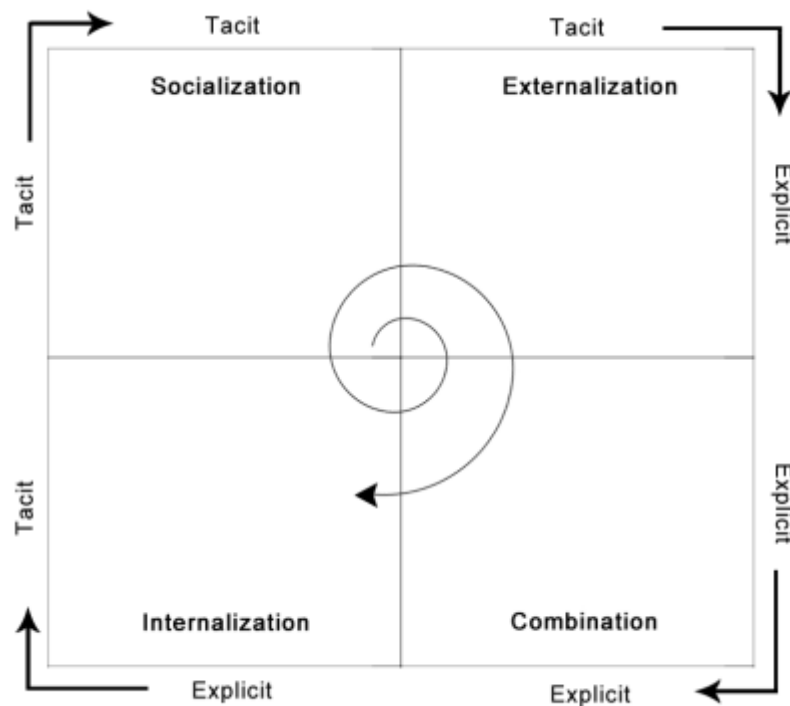
The last dimension, in which movement is learnt, is by being *in* movement. This is according to Duesund (2001) a phenomenal side of learning through movement, one is concerned with the inherent values of the activities (Brown, 2013). Skjærven (2006) relates this to the personal experience of moving, as it highlights the participatory perspective of the individual (Brown, 2013). It is private and does not have any referrers. When learning movement by *being in* movement Arnold (1979) defines the movement as a goal in itself – the goal exists within the experience itself (...), and it emphasizes the subjective body (Duesund, 2007, p. 84). We become aware ourselves in relation to what we do and learn to know ourselves through movement. According to Arnold; “the Self is an arena for emotions which only occurs when we move” ((1979) cited in Duesund (Duesund, 2001, p. 103). Developing an understanding of self and making meaning from lived experiences is, in and of itself, fundamentally important for us as humans (Brown, 2013). Movement can be described as “meaning in the making”, and it is only through the making of movement and its experience we can begin to reflect upon the sense of being in the world. Kleinmann (1972, p. 177) describes this as uncovering a deeper meaning of one’s being by exploring movement experiences.

The movement awareness learning cycle (Figure 2) described above is a personal and dynamic process where the BBAM students learn movement awareness through experience and by *being in* movement, making tacit knowledge of movement explicit. The process of movement awareness learning is also a prerequisite to change movement habits. Through the movement awareness learning process students gain experiential and self-regulative knowledge necessary for evolving and refining the skill of movement awareness and the skill of observing, describing and recognizing health aspects in movement quality.

### **2.4.3 Tacit to explicit knowledge – a knowledge spiral evolving competence**

In order to learn how to evaluate movement quality of the whole moving person using BARS-MQE, the students also need to acquire conceptual and socio-cultural knowledge of movement. I will in the following section present a model of how to facilitate the process of converting tacit experiential and self-regulative knowledge of movement awareness into explicit knowledge. This process is necessary to acquire sufficient competence to rate movement quality using BARS-MQE.

Nonaka and Takeuchi (1995) created a dynamic model of how tacit and explicit knowledge becomes organizational knowledge. Their model is based on a study of Japanese organizations within a wide variety of industry segments. Their model is founded on unique features of Japanese Zen Buddhism. This tradition emphasizes “oneness of body and mind” and the importance of learning from direct experience, as well as through trial and error. Like a child learning to eat, walk and talk, they learn with their bodies, not just with their minds (Takeuchi, 2006). In their model knowledge is created and developed in social interaction between tacit and explicit knowledge. They describe this interaction as knowledge conversion (1995, p. 61). Nonaka and Takeuchi (1995, p. 62) postulates four modes of knowledge conversion, known as the SECI (socialization, externalization, combination, and internalization) process, or The Knowledge spiral (Figure 3).



**Figure 3** The Knowledge Spiral (Nonaka & Takeuchi, 1995, p. 62)

#### 2.4.3.1 Socialization

The first mode of the Knowledge Spiral is Socialization (Figure 3). This is described as developing a common understanding through “a process of sharing experiences and thereby creating tacit knowledge such as shared mental models and technical skills” (Nonaka & Takeuchi, 1995, p. 62). Within the educational frames of BBAM this mode is facilitated by the teachers creating a common understanding of movement awareness and movement qualities through daily movement sessions. In the beginning of their studies the students develop a common understanding of the practice by “being on the floor” together with the teachers. “Floor-work” includes (1) being in movement, (2) observing movements and (3) imitating movements. Being in movement is directly connected to the “Movement Awareness Learning Cycle” developed by Skjærven et al. (2010) (Figure 1). Direct observation of movement is a good way to convey tacit knowledge. The student observes how a movement is done/guided, as in a master-apprentice relation. The direct observation is often supplemented by metaphors, and amplifies the observation made. Imitation of a

task/movement based on direct observation is together with experimenting and comparison, also a way to convey tacit knowledge. Accurate imitation requires detailed observation of all aspects of the movement in question (Moore & Yamamoto, 2012).

#### **2.4.3.2 Externalization**

In the second mode of the Knowledge Spiral, tacit knowledge of movement is articulated into explicit knowledge. Learning through movement leads to experiential knowledge and skills. Nonaka and Takeuchi (1995) are in line with Dewey (1916) when they recognize two equally important aspects of experiential knowledge: The performance of movement and the report or description of the movement.

In BBAM, the performance of the movement is supported by teachers using metaphors and analogies whilst guiding the students in movement. Metaphors and metaphorical thought is shown to influence the embodiment of experiences made (Lakoff, 2012). The description of the experiential based knowledge of movement is closely connected to Arnold (1979) and the concept of the reflective practitioner (cited in Duesund (2007)). It is not adequate to perform the movement, one needs to describe explicitly what has been implicitly performed (Duesund, 2001). In this setting, the Movement Quality Model is a map to follow of what to observe. It gives an overview of perspectives, elements and aspects of movement quality. The teachers can facilitate the movement awareness learning process by encouraging the students to verbalize their personal experiences, and facilitate the conversion of tacit knowledge of movement awareness into explicit knowledge.

#### **2.4.3.3 Combination**

The third mode of the Knowledge Spiral is Combination of different bodies of knowledge. In BBAM, the conceptual knowledge relevant for movement evaluation is combined with experiential-based knowledge of movement, in order to learn to observe, describe and

evaluate movement quality using BARS-MQE. The conceptual knowledge is mediated through written or oral language, and is dependent upon meaning to be valid.

Evaluating Movement Quality using BARS-MQE requires that the therapist facilitates movement for the client to express the most healthy, functional movement possible – BARS-MQE is as such process-oriented. BBAT has a clear movement pedagogy and therapeutic components which seek to promote movement quality (Skjærven et al., 2010). The therapeutic components and the movement pedagogy are conceptualized, and become important conceptual knowledge which in turn helps the student to evaluate movement quality. The conceptual knowledge of verbal Guidance in BARS (Appendix 2) is combined with the actual performance of guiding a client in the BBAT movements. The tables provide support for the student and cues to the client. The tables show the therapist what to find in himself and what to observe in the client. Together, this creates an atmosphere that supports the client's self-awareness, and makes him become aware of the movements. The guidance also supports the client to find words to describe the immediate experience.

Converting complex tacit knowledge of movement awareness and of how to observe movement quality depends on exchanging experience with experts. In BBAM teachers and teacher candidates support the students process of converting the more or less tacit knowledge of observing movement quality by guiding them in own movement awareness, spatial organization of observation, what do they see, connecting and combining this with conceptual knowledge of i.e. BARS- Movement Quality scores.

#### **2.4.3.4 Internalization**

The last mode of knowledge conversion is Internalization. This mode is a process of embodying explicit knowledge into tacit knowledge in other members (such as students, patients, colleagues) within the field they are working, and thereby starting a new spiral of



knowledge. This mode is closely related to “learning by doing”: Knowledge and experience is transferred through observation, practice, trial and error (Nonaka & Takeuchi, 1995). For the BBAM students this mode of knowledge conversion takes place in their clinical practice. As Dewey, Nonaka and Takeuchi (1995, p. 239) place strong emphasis on the importance of bodily experiences, and claim that the most powerful learning come from bodily experience. Nonaka and Takeuchi (1995) claim, that personal and physical experiences are just as valuable as indirect, intellectual abstraction.

## **2.5 Summary of theory**

According to Ahola et al. (2017) there is a need within the physiotherapy education system to pay more attention to the frames of the learning situations. In order to acquire competence for evaluating movement quality using BARS-MQE, the BBAM students need to learn conceptual, experiential, self-regulative and socio-cultural knowledge. Arnold (1979) advocates the importance of learning experiential knowledge “about, through and by *being in*” movement. The process of learning by *being in* movement is described stepwise in the Movement Awareness Learning Cycle (Skjærven et al., 2010), and is founded upon the theory of Dropsy (1983, 1987). Increased movement awareness becomes an important precondition for learning to evaluate movement quality. The learning frames of BBAM can be viewed in light of Nonaka and Takeuchi’s Knowledge Spiral (1995). Blending together the experiential knowledge with other bodies of knowledge, and reflecting upon experiences made, becomes a prerequisite for converting tacit knowledge to explicit knowledge and skills, when learning to evaluate movement quality using BARS-MQE.

## **3 PURPOSE AND RESEARCH QUESTIONS**

### **3.1 Purpose**

The purpose of this study was to explore whether students in the international, post-graduate study programme in physiotherapy, Basic Body Awareness Methodology (BBAM), learn to observe and score movement quality, and whether their movement observation scores are more in concordance to those of a reference group of experienced clinicians after 1 year of study and practice.

It is hypothesized that the students will improve their ability to observe, describe and score movement quality over time, and hence obtain more scores that are more similar. To explore whether the students' observational skills evolve, as a result of their learning process, comparison of scores will be made between two test points, expecting more similarity in scores after one year of study and practising, than at the start of the study.

### **3.2 Research questions**

1. How similar are Basic Body Awareness Methodology (BBAM) students in their evaluation of movement quality using Body Awareness Rating Scale -Movement Quality and Experience (BARS-MQE) at the start of the BBAM study?
2. How similar are the students in their evaluation of movement quality using BARS-MQE after one year of BBAM study?
3. Does the learning process over time lead to an improved ability to observe movement quality, manifested in scores that are more similar?
4. Does the learning process over time lead to students' scores that are more similar to those of a reference group of experienced clinicians?

## **4 MATERIAL AND METHOD**

### **4.1 Research design**

Designing a research study implies creating an overall plan for addressing a research question, including specifications for enhancing the study's integrity (Polit & Beck, 2012). As I wanted to study how evaluation of movement quality as a skill evolves through the course of the BBAM education programme, I planned to explore how 30 students evaluated a video recorded client using BARS-MQE at the beginning and after one year of the BBAM programme. A cross-sectional design was used to describe scores at each of the two test points, and a longitudinal design to compare concordance and variability of scores in the group of students at the two test points, and in relation to a group of skilled physiotherapists. Cross-sectional studies are often described as snapshots (Payne & Payne, 2004). A cross-sectional design implies one data-collection, and is used in order to describe the relationship between variables or phenomena at a particular point in time (Polit & Beck, 2012), or the status of a group at a particular point in time (Carter, Lubinsky, & Domholdt, 2011). A cross-sectional design is suitable when promoting logical reasoning regarding one variable leading to another. In my study, one could expect the incipient learning process in the post-graduate study programme BBAM is very much a precondition in order for the students to describe and score movement quality similarly through BARS-MQE.

To explore whether the students' skills of observing, describing and scoring movement quality evolved as a possible result of the learning process, comparisons of scores were made between the two test points, expecting more similarity in scores after one year of study and practising, than at the start of the study. This part of the study comprised a longitudinal test-retest design.

A longitudinal design implies data collection at more than one occasion, over a longer period of time (Polit & Beck, 2012). This type of design is appropriate in order to study time-related processes. In my case I wanted to capture the possible impact of the learning process over

time on the students' ability to evaluate movement quality, observing whole movement coordinations, "from sole of the feet to the top of the head", in line with the BARS-MQE methodology. A repeated measures design was, accordingly, chosen to evaluate the change over time in movement quality scores of a single-group of students. As the group would not be compared to other groups it is considered a within-group design (Carter et al., 2011). The incipient learning process through the BBAM programme is expected to be a precondition in order for the students to be sufficiently skilled in observing, describing and scoring movement quality in line with the BARS-MQE methodology. The BBAM education is therefore described below as an intervention expected to influence the students' skills of evaluating movement quality.

## **4.2 Material**

### **4.2.1 Participating students**

The participants were a convenience sample of students. All first-year students in the post-graduate BBAM study programme starting in 2015 were offered participation in this study. To become enrolled as a BBAM student it is required to have a Bachelor's degree as a physiotherapist with authorization to work as a physiotherapist, as well as basic oral and written skills in English. All the thirty students agreed to participate. They came from 15 different countries in Europe, America (north/south) and Asia, with clinical experience of mean 12 years and a range of 28 years of experience (data from 15 students).

### **4.2.2 Reference group**

Four skilled clinicians (physiotherapists) agreed to score the video recording in 2016 (Table 1). They were all qualified BARS-MQE evaluators, with long clinical experience, minimum 6 and maximum 41 years. Their mode and range of scores were to be used as "golden standard" for comparison with the students' scores.

**Table 1** Reference group: clinical experience and academic competence

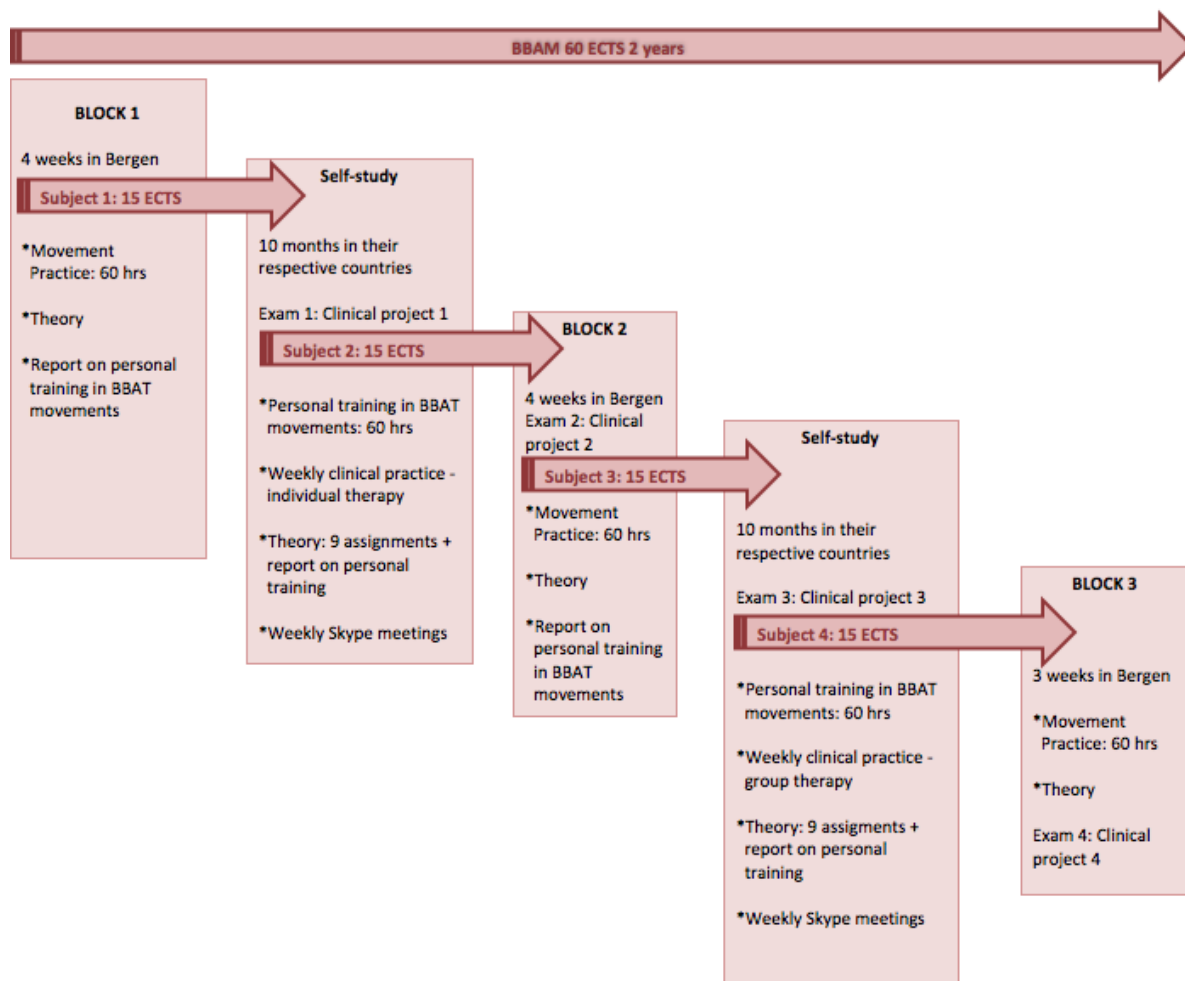
Clinician	Clinical experience, n=years	Academic competence
1	41	PT, BA, Teacher IATBBAT*
2	6	PT, Msc
3	28	PT, Msc, PhD student, Teacher candidate IATBBAT
4	9	PT, Msc, PhD, Teacher candidate IATBBAT

\*IATBBAT, International Association of Teachers Basic Body Awareness Therapy

## 4.3 Method

### 4.3.1 Basic Body Awareness Methodology (BBAM) education - intervention

The Basic Body Awareness Methodology is an international post-graduate physiotherapy study programme in mental health, located at Western Norway University of Applied Sciences (HVL), Bergen, Norway. BBAM builds on the physiotherapeutic modality Basic Body Awareness Therapy (BBAT). The 60 ECTS programme is organized as a part time study over two years. There are three blocks of coursework at HVL, in total 11 weeks, and two periods of self-study at home, each lasting 10 months, supervised by teachers in BBAM (Figure 4). English is the written and oral language.



**Figure 4** Structure of the Basic Body Awareness Methodology (BBAM) programme (based on BBAM 2015-2017 curriculum HVL)

#### 4.3.1.1 Educational principles.

The BBAM programme is designed on educational principles merging skill training, theory and movement awareness learning, according to the principles of movement quality. The overarching didactic approach rests on four pillars: 1. Conceptual knowledge, 2. Experiential knowledge from clinical studies and clinical implementation, 3. Experiential knowledge from personal training, 4. Assignments/reports/clinical projects (clinical projects 1-4). These four pillars are implemented in Blocks 1-3 and in the periods of self-study through seminars, lectures, project work, in individual and group therapeutic settings. In Blocks 1-3 the curriculum includes extensive movement practice ("*floor work*") to promote

movement awareness learning through movement quality, by being in daily life movements in BBAT. The movement awareness learning creates personal, perceptual and experiential knowledge, important for observing and recognizing movement elements and aspects in the observed client.

Experiential knowledge is important in order to learn the skill of observing movement quality. This knowledge is gained through roleplay, rehearsing guidance, observation and evaluation of each other's movements. In the periods of self-study, the experiential knowledge is gained from clinical settings. The conceptualization and reflections over experiences made is important for increasing the self-regulative knowledge, and is assumed to strengthen the learning outcome, and refine the acumen of observing, describing and scoring movement quality with less variability and more in concordance with others. By combining and blending together skills, conceptual, experiential and self-regulative knowledge, converting tacit knowledge into explicit knowledge, the BBAM students acquire professional skills of evaluating movement quality.

#### **4.3.1.2 Theoretical and practical supervision in BBAM methodology**

Teachers in BBAM provide supervision on clinical implementation of BBAM and its methodology, 40 hours each year. In the block periods at HVL, supervision is given during skill training, personal training, movement guidance, role-play and case presentation (films). In the periods of self-study, the students are organized in groups for weekly meetings on Skype. Teachers at BBAM on monthly assignments give supervision individually and in groups, which is written as structured reports of clinical cases. The amount of personal training in the BBAT movement and its principles is estimated to 60 hours for each of the blocks and periods of self-study (Figure 4).

#### **4.3.1.3 Self-study including clinical BBAM practice.**

The student is responsible for implementation of literature studies, monthly assignments, exams, clinical practice and personal training in the two periods of self-study, according to the curriculum.

Clinical practice is estimated to one day a week for 10 months, making a total of 150 hours of clinical practice each of the two years, the first year within individual physiotherapy and the second year within group physiotherapy, smaller and larger groups. In both individual and group therapy the student is to arrange for therapy settings over 8-10 sessions, each lasting approximately 60 minutes.

#### **4.3.2 Independent variable**

The independent variable is the variable believed to cause or influence the dependent variable (Polit & Beck, 2012). In this study, the learning process at BBAM is the independent variable or intervention.

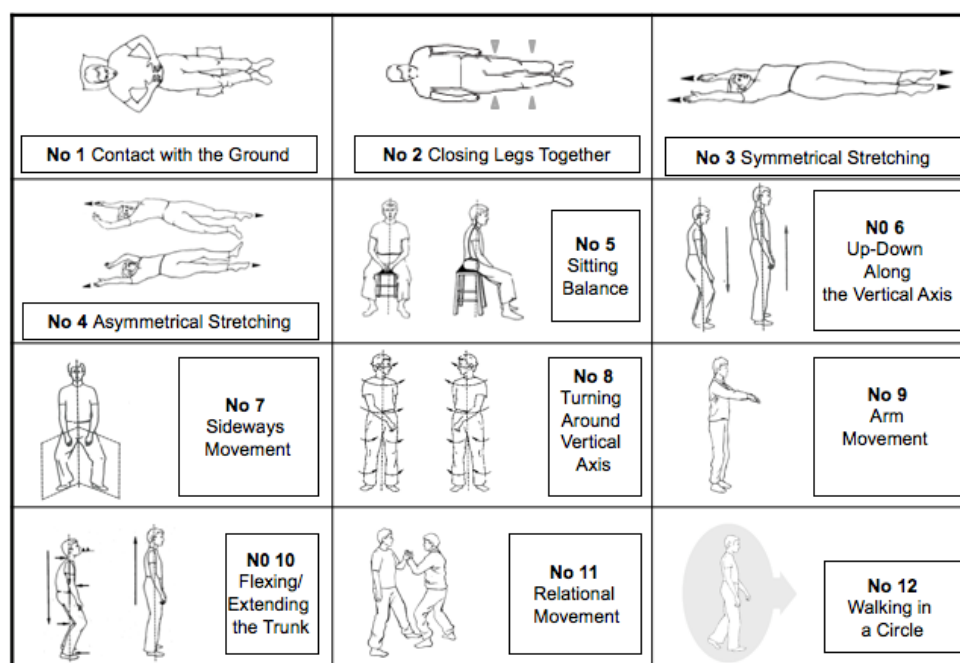
#### **4.3.3 Dependent variable**

The dependent variable is hypothesized to depend on or be caused by another variable, and is considered to be the outcome variable of interest (Polit & Beck, 2012). In this study, the movement quality scores from BARS-MQE will be the outcome measure of interest.

The evaluation of movement quality, based on observation and description, is evaluated on a 7-step ordinal scale, from 1 to 7. A score of 7 is defined as the most healthy, functional movement quality, described as balanced, free, centered, unified, rhythmic, and synchronous. A score of 1 is defined as the most pathological, dysfunctional movement quality, described as unstable, mechanical, stiff, and un-rhythmical with a lack of unity. The sum score of all items ranges from 12 to 84 (Skjærven et al., 2015). The scale includes half



(0.5) scores to make the scale more sensitive to differences between individuals and sensitive to nuances of change, both over time and within each therapy session.



**Figure 5** Movements 1-12 evaluated in the BARS-MQE (Skjærven, 2015). Reprinted with permission.

Each score (1-7) of BARS-MQE is given a thorough description, see Appendix 1. The scale is intended to quantify the therapists' movement quality observations. Evaluation part (i) also includes the therapists' qualitative descriptions or comments of the movement observations. Simplified the scorings can be described like:

1. Dysfunctional MQ
2. Mostly dysfunctional MQ
3. Weak functional MQ
4. Some MQ
5. Moderate functional MQ
6. Good functional MQ
7. Very good functional MQ (Skjærven, 2015)

#### **4.3.3.1 Measurement properties of BARS-MQE**

BARS-MQE consists of two evaluation parts: (i) description and scoring of movement quality based on observation of the 12 movement items and (ii) interview of the patient about movement awareness immediately after exploring each movement. A factor analysis supported a relationship between these two parts (Ulla Britt Skatteboe, 2000).

Measurement properties (inter-tester reliability and validity) of BARS-MQE have been examined in pilot studies (U.B. Skatteboe, 2005; U.B. Skatteboe et al., 1989), indicating sufficient reliability for clinical use. Skjærven et al. (2015) examined internal consistency, inter-tester, test–retest reliability and construct validity in 25 healthy persons and 25 patients with long-lasting musculoskeletal disorders and mental health problems, following recent international guidelines for examination of measurement properties (Mokkink et al., 2010). The study showed very high internal consistency, high inter-tester and test–retest reliability, and low measurement error when BARS-MQE was used by qualified testers. It is difficult to determine, however, to what degree the observational skill level of a therapists will affect the measurement properties of BARS-MQE. Skjærven et al. (2010) pointed out that the therapists' awareness towards own movements was an important precondition for evaluation, understanding and promotion of movement quality.

#### **4.3.4 Video recording of person in BARS-MQE evaluation**

A video film was developed recording a test situation where an experienced BBAT therapist guided a client in the 12 BARS-MQE movements (Figure 5). The therapist applied the verbal guidance from the BARS manual (Appendix 2) in English. The client had excellent English language skills, and it was her first experience with BBAT and BARS-MQE. The client signed a written letter of consent for participating in the making of the video. She was also informed and agreed upon of the usage of the video for education and research purposes.

The camera had a static position throughout the video recording, with a camera angle of approximately 45° to the front of the observed person, capturing both the therapist

(side/back) and the client (side/front) (Figure 6). The therapist followed the procedures described in Appendix 2 of therapist placement in relation to the client. Each test item (movement) was recorded separately and successively, and each item was recorded only once.



**Figure 6** Examples of lying, sitting and standing placements of therapist/client

The duration of the video clips varied from approximately 3 to 4 minutes, depending on various lengths of the verbal guidance and time to bring forward the healthiest, functional movement. The item number and name was announced each movement item in the video. The total length of the video was 42 minutes.

#### **4.3.5 Data collection**

The students were informed about the study 2 days prior to the BARS-MQE evaluation in 2015. They were given written and verbal information about the study, as well as a letter of informed consent to be signed and handed in prior to the data collection. All students participated in the tuition for four days prior to the BARS-MQE evaluation.

On the evaluation day in 2015, the students were given a BARS scheme (Appendix 3) to describe and score MQ of the video recorded client. They were informed only to focus on evaluation part (i): Description and scoring of movement quality based on observation of the 12 movement items. Evaluation part (ii): “Interview of the patient about movement awareness immediately after exploring each movement” was not included in this study. They were also given the Body Awareness Rating Scale (BARS) - Movement Quality Scores (Appendix 1) as a support for describing and scoring MQ. The students were informed of the

ethical considerations regarding the data collection. The setting for the students' scoring of MQ from video was in the "movement room" at HVL. The room was prepared with chairs in two semi-circles facing the video recording, and I placed myself in the front/to the side to pause/control the video.

The temporal organization of the data collection was planned according to the students' time schedule, at the end of the fourth day of education. The BARS-MQE evaluation including completion of a reflection paper was estimated to 1 hour. The reflection paper concerned each student's experience of the scoring session, but this part was later omitted from the study due to time constraints, and the fact that the data did not fall within the research questions of this study.

The same procedure of data collection was followed in 2015 and 2016, and was carried out as planned. The film itself lasted for 42 minutes. After showing the first BARS movement, I decided together with the teachers to mute the patients' verbal comments to avoid bias. In fear of technical difficulties if I paused the film, I decided to let the film roll and let the students score in the muted parts of the patient's comments. The students had approximately 45-90 seconds to score each item.

#### **4.4 Statistical analysis**

SPSS-Statistical Package for the Social Sciences was used to describe and explore the BARS-MQE scores. The data of each movement item were presented in histograms showing frequency of scores on the 1-7 point scale. The range and mode of scores were described, as well as percentages of scores calculated within  $\pm 1$  score in relation to the mode. Variability and concordance is considered reasonably good when a score was within  $\pm 1$  of the mode. The sum scores of BARS-MQE were also described as mean (SD), and range, and comparisons were made between the two test points using paired samples t-test. The students' scores were clustered in whole scores; i.e. 4.0 and 4.5 were clustered as 4 – as

scores of 0.5 is predominantly used in therapy settings, and would as such create excessive demands to an agreement with such a finely divided scale. In some of the movement items multiple modes occurred, both in the students' scores and in the reference groups' scores. For both groups, I decided to choose the highest mode as healthy movement resources are emphasized in BBAT. The mode was used as a measure of equality in scores among the students and the range as a measure of within-group variability. The findings are presented in histograms and tables.

The students' item scores were compared to those of the clinicians. The sum scores in 2015 and 2016 were also calculated (mean, SD and range) and compared to consider a possible change in the ability to observe movement quality. The students' scores were compared with those of the clinicians, serving as a reference group of experts. A paired t-test was performed to examine whether the students' BARS-MQE sum scores had changed statistically significant from 2015 to 2016.

## **4.5 Ethical considerations**

Ethical considerations must be taken in studies involving human beings. The study was performed according to the Helsinki Declaration. The participants were informed of the purpose of the study, the implication of participation, how the data would be used, that participation was voluntary, and also their right to self-disclosure. If desired, the participants would be informed of the results on a group level. All the students signed a written informed consent.

The students were informed in the written consent form that their BARS-MQE evaluation would be anonymized. Only the project leader and tutor had access to the identification key. The material was kept locked and inaccessible, following the rules and regulations of the institution (UiB) and The Data Inspectorate (Malterud, 2011, p. 205). Anonymization is

important in this setting, because some students could possibly fear the stigma of scoring differently from the others.

The students observed, described and scored movement quality on a client with no known illnesses. The client was informed of the purpose of the study. The participating client signed the written consent form, and allowed usage of the film both for the purpose of the study, and for teaching purposes. Both the client and the therapist were shown a draft of the method chapter where the procedure of video recording was described, and they agreed in written to the use of the pictures illustrating placement of therapist and client.

As I did not utilize patients in the study, it was not necessary to apply for approval from the Regional Committees for Medical and Health Research Ethics (REC). The Norwegian Social Science Data Services (NSD) was contacted regarding the study. According to Personopplysningsforskriften § 7-20 we were informed that the project could be considered a quality assurance project within the BBAM programme. The project was, accordingly, exempt notification. Liv H. Skjærven as coordinator of the BBAM programme, approved this study as it served as an important learning situation for the students. Below is the reply (in Norwegian) given by e-mail from the NSD, in October 12<sup>th</sup>, 2015:

*«Personopplysningsforskriften § 7-20 hjemler unntak fra melde- og konsesjonsplikt for "Behandling av personopplysninger om (...) studenter som skjer i medhold av (...) universitets- og høyskoleloven eller etter samtykke fra den enkelte (...)." Av Universitets- og høyskoleloven § 1-6 fremgår det at: "Universiteter og høyskoler skal ha et tilfredsstillende internt system for kvalitetssikring. Studentevalueringer skal inngå i systemet for kvalitetssikring". Det innebærer at f.eks. spørre- og intervjuundersøkelser blant studenter og dokumentanalyse av studentarbeider kan unntas meldeplikt når formålet er å evaluere og kvalitetssikre undervisningen/studietilbudet. Det er utdanningsinstitusjonen selv som må vurdere om behandlingen av personopplysninger skjer i medhold av universitets- og høyskoleloven, slik at unntak fra meldeplikten kan gjøres gjeldende. Vi minner om at personopplysningslovens øvrige bestemmelser gjelder, selv om behandlingen kan unntas meldeplikt. Det innebærer bl.a. at det som en hovedregel skal innhentes aktivt, informert og frivillig samtykke, med mindre behandlingen har annet hjemmelsgrunnlag. Det innebærer også at behandlingsansvarlig institusjon skal ha oversikt over behandlingene og internkontroll med at disse oppfyller kravene i personopplysningsloven»*

## 5 RESULTS

I here present and compare *how* the students in the BBAM study scored movement quality in the same person based on video recordings in 2015 (start of study) and 2016 (after one year of study), using each of the twelve movement items in BARS-MQE as well as the BARS-MQE sum scores. The data for each item are shown in histograms (Figures 7 – 18) and range of scores and mode are presented in tables (Table 2 and 3). The students' BARS-MQE scores are also compared to the mode and range of scores of a reference group. As it is expected that experienced BARS-MQE clinicians will produce rather consistent and similar results, their BARS-MQE data were only collected once, in 2016.

Two students did not score an item in 2015, item 3 and item 12, respectively. This did not interfere with the mode presented in the results as it was rather robust. The mean BARS-MQE sum scores of 2015 and 2016 were calculated based on scored items of included students. Five students were missing at the 2016 evaluation, four of them due to drop-out from BBAM education. Additionally, one student scored only three items, and one student did not score one of the twelve items. A decrease of mean scores and mode from 2015 to 2016 means less functional movement quality, whilst increase of mean and mode means more functional movement quality, respectively.

First, I will present and compare the students' BARS-MQE sum scores for 2015 and 2016 with those of the reference group. Secondly, I will compare the students' scores of each BARS-MQE item in 2015 and 2016 with those of the reference group.

## 5.1 BARS-MQE sum score

The BARS-MQE Sum Score data were explored for normality, and Kolmogorov-Smirnov indicated normality in 2015 ( $p=0.200$ ), and borderline normality in 2016 ( $p=0.047$ ).

In 2015 ( $n=28$ ) the BARS-MQE Sum Score was mean 4.0 (SD 0.5), varying from 3.2 (min) to 5.1 (max) (range 1.9). In 2016 the BARS-MQE Sum Score was mean 3.6 (SD 0.4), varying from 2.9 (min) to 4.3 (max) (range 1.4). The t-test showed a mean decrease of 23 students' scores of 0.3 (SD 0.4) from 2015 (mean 3.9) to 2016 (mean 3.6), and the change was statistically significant ( $p= 0.002$ ). The reference group's BARS-MQE Sum Score in 2016 was mean 3.4 (SD 0.3), varying from 3.0 (min) to 3.8 (max) (range 0.8).

The students' mean scores were accordingly more similar to the clinicians' scores in 2016 than in 2015 and variability by SD and range values decreased. The students evaluated movement quality within mode  $\pm 1$  score ranging from 80.0% – 96.6% for the separate items in 2015 while they ranged from 62.5% – 100.0% in 2016.

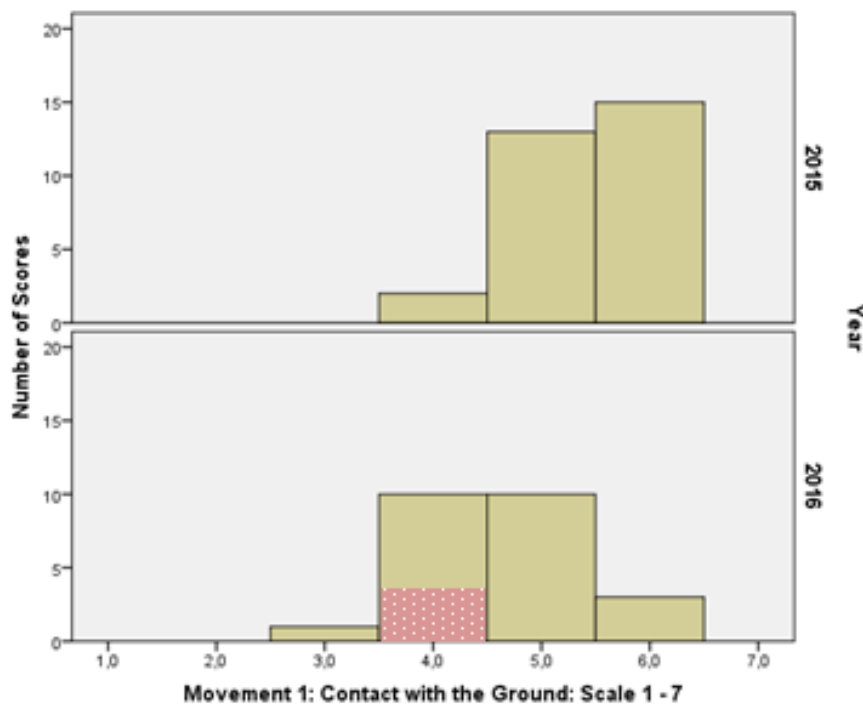


## 5.2 BARS-MQE movement items 1-12

### 5.2.1 Movement 1: Contact with the Ground

In 2015, the students scored between 4 and 6 on the 1-7 point scale (Figure 7) – with a range of 2 (Table 2). The mode was 6 and 93.3% of the students scored within the mode  $\pm 1$  score (Table 3).

In 2016, the students' mode changed to 5, and more students scored within the mode  $\pm 1$  score (95.8%) (Table 3), while all the clinicians in the reference group scored 4 (Figure 7). The range increased to 3, and the students scored between 3 and 6. The clinicians in the reference group had no variability in their scores.



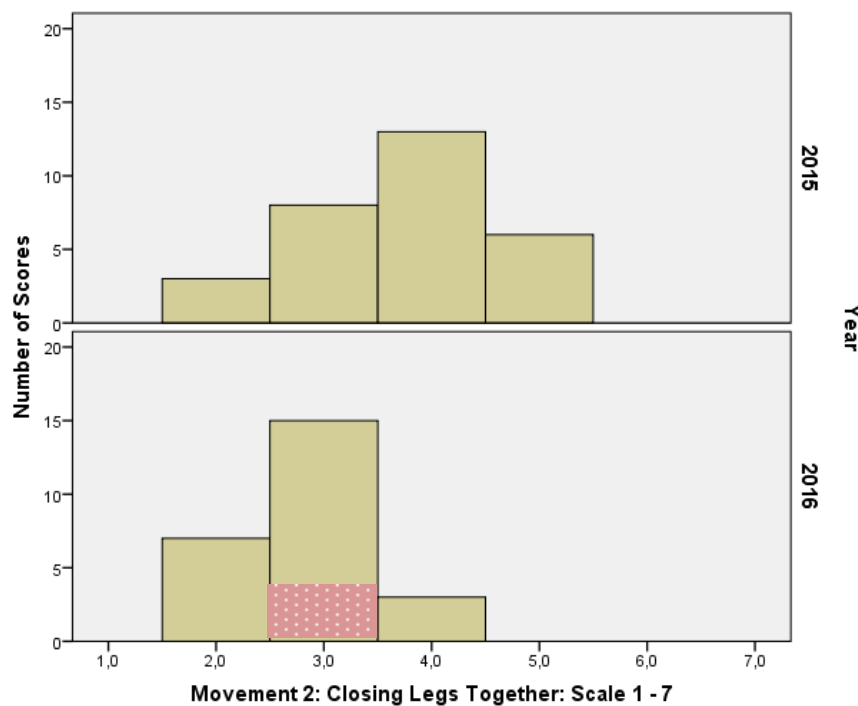
**Figure 7** Histogram of students' BARS scores in 2015 and 2016, Movement 1

Reference group's mode shown as dotted column

### 5.2.2 Movement 2: Closing Legs Together

In 2015, the students scored between 2 and 5 on the 1-7 point scale (Figure 8), with a range of 3 (Table 2). The mode was 4 and 90.0% of the students scored within the mode  $\pm 1$  score (Table 3).

In 2016, the students' mode changed to 3, and all students scored within the mode  $\pm 1$  score (100%) (Table 3). Students and reference group had the same mode in 2016. The range decreased to 2, and the students scored between 2 and 4. The clinicians in the reference group had a range of 1 in their scores.



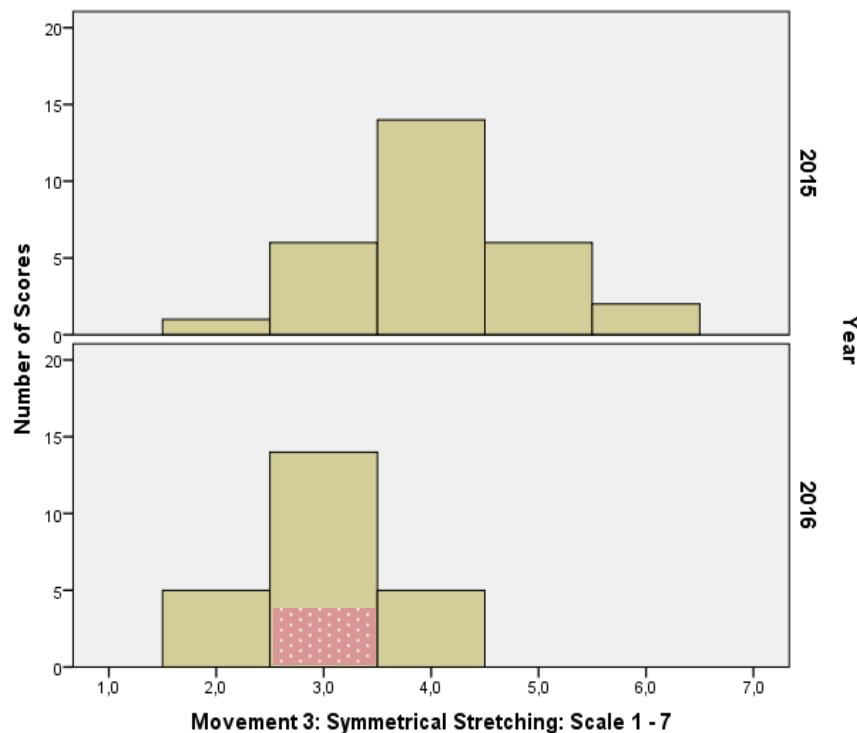
**Figure 8** Histogram of students' BARS scores in 2015 and 2016, Movement 2

Reference group's mode shown as dotted column

### 5.2.3 Movement 3: Symmetrical Stretching

In 2015, the students scored between 2 and 6 on the 1-7 point scale (Figure 9), with a range of 4 (Table 2). The mode was 4 and 89.6% of the students scored within the mode  $\pm 1$  score (Table 3).

In 2016, the mode changed to 3, and all students (100%) scored within the mode  $\pm 1$  score (Table 3). Students and reference group had the same mode in 2016. The range decreased to 2, and the students scored between 2 and 4. The clinicians in the reference group had a range of 1 in their scores.



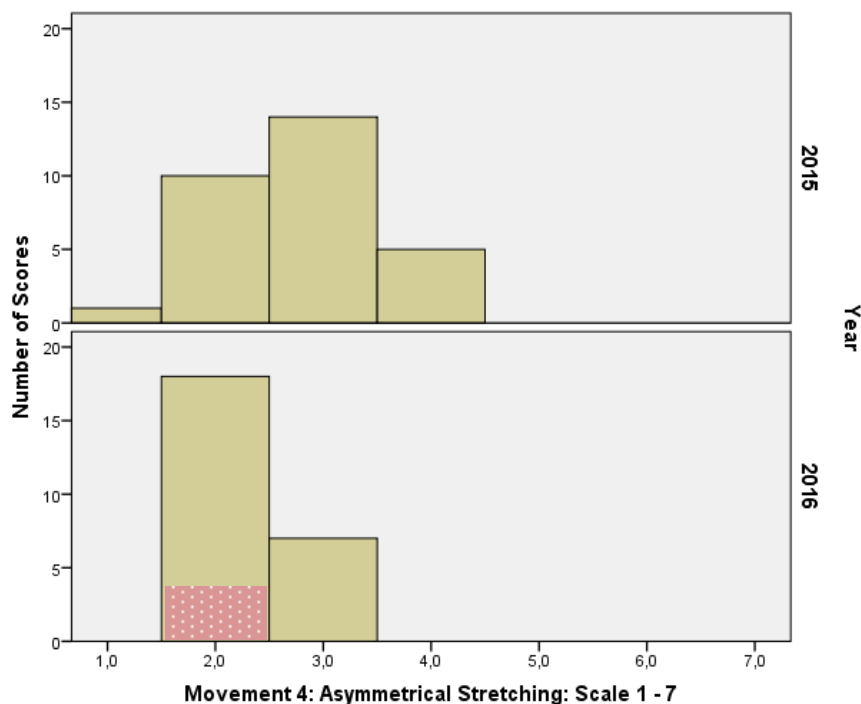
**Figure 9** Histogram of students' BARS scores in 2015 and 2016, Movement 3

Reference group's mode shown as dotted column

### 5.2.4 Movement 4: Asymmetrical Stretching

In 2015, the students scored between 1 and 4 on the 1-7 point scale (Figure 10), with a range of 3 (Table 2). The mode was 3 and 96.6% of the students scored within the mode  $\pm 1$  score (Table 3).

In 2016, the mode changed to 2, and all students (100%) scored within the mode  $\pm 1$  score (Table 3). Students and reference group had the same mode in 2016. The range decreased to 1, and the students scored between 2 and 3. The clinicians in the reference group had no variability in their scores.



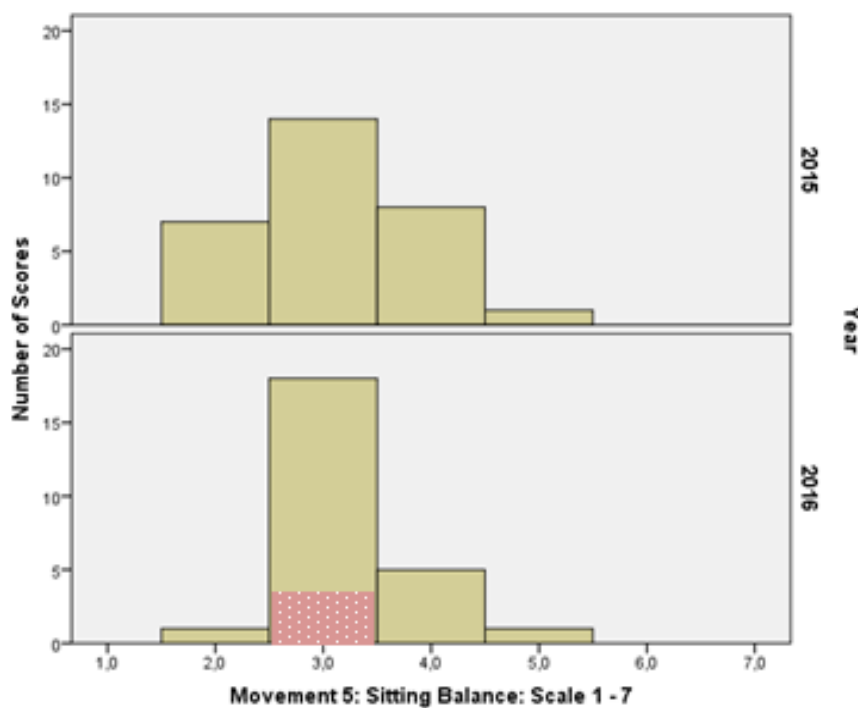
**Figure 10** Histogram of students' BARS scores in 2015 and 2016, Movement 4

Reference group's mode shown as dotted column

### 5.2.5 Movement 5: Sitting Balance

In 2015, the students scored between 2 and 5 on the 1-7 point scale (Figure 11), with a range of 3 (Table 2). The mode was 3 and 96.6% of the students scored within the mode  $\pm 1$  score (Table 3).

In 2016, the mode was unaltered as 3, and slightly less students scored within the mode  $\pm 1$  score (96.0%) (Table 3). Students and reference group had the same mode in 2015 and 2016. The students' range was unaltered as 3 from 2015 to 2016, while the clinicians in the reference group had a range of 1 in their scores.

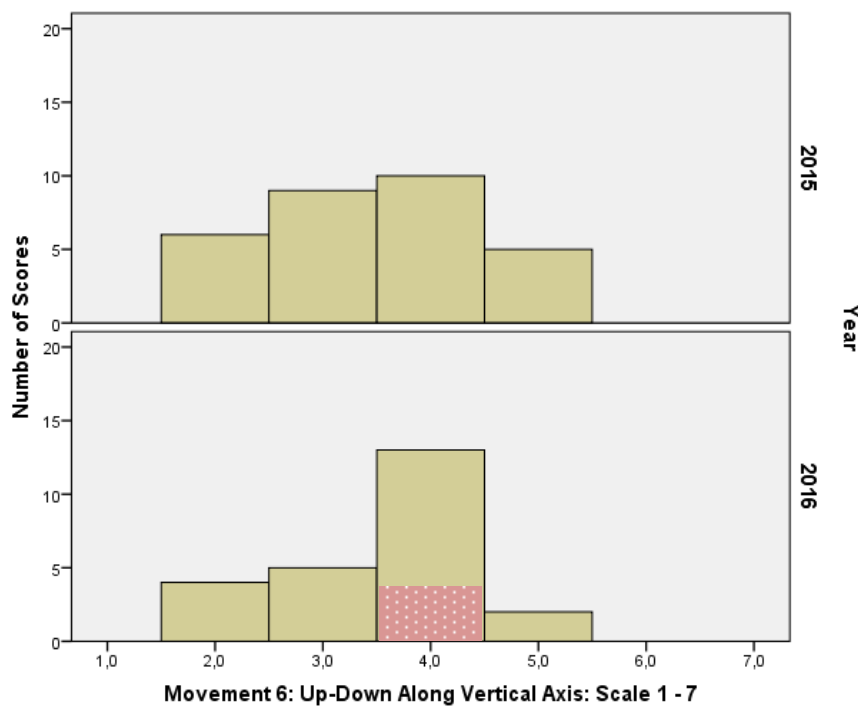


**Figure 11** Histogram of students' BARS scores in 2015 and 2016, Movement 5  
Reference group's mode shown as dotted column

### 5.2.6 Movement 6: Up-Down Along Vertical Axis

In 2015, the students scored between 2 and 5 on the 1-7 point scale (Figure 12), with a range of 3 (Table 2). The mode was 4 and 83.3% of the students scored within the mode  $\pm 1$  score (Table 3).

In 2016, the mode was unaltered as 4, and more students scored within the mode  $\pm 1$  score (83.3%) (Table 3). Students and reference group had the same mode in 2015 and 2016. The students range was unaltered as 3 from 2015 to 2016, while the clinicians in the reference group had a range of 1 in their scores.



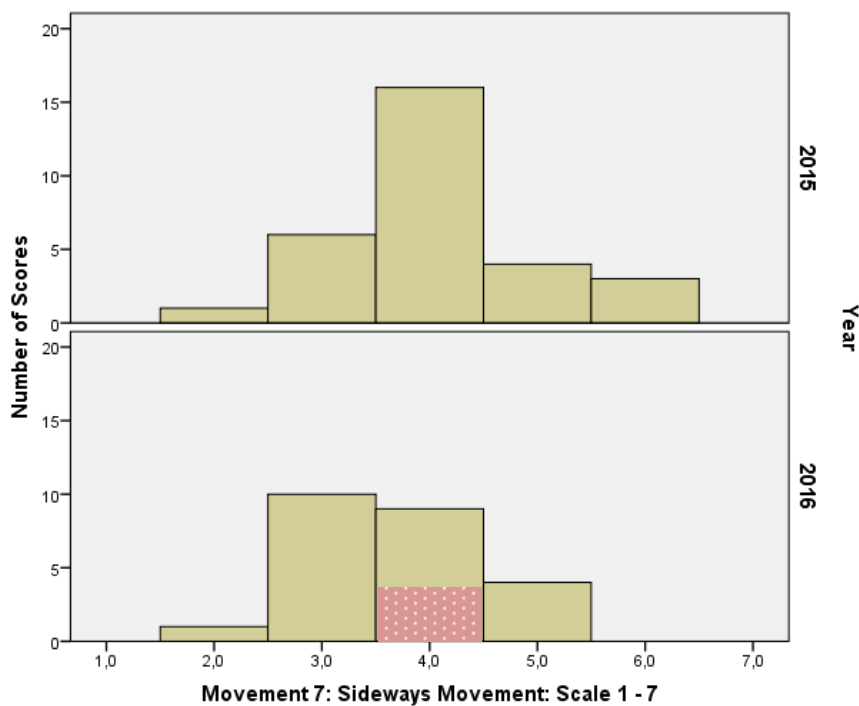
**Figure 12** Histogram of students' BARS scores in 2015 and 2016, Movement 6

Reference group's mode shown as dotted column

### 5.2.7 Movement 7: Sideways Movement

In 2015, the students scored between 2 and 6 on the 1-7 point scale (Figure 13), with a range of 4 (Table 2). The mode was 4 and 86.6% of the students scored within the mode  $\pm 1$  score (Table 3).

In 2016, the mode was changed to 3, and less students scored within the mode  $\pm 1$  score (83.3%) (Table 3), while the reference group's mode was 4 (Figure 13). The range decreased to 3, and the students scored between 2 and 5, while the clinicians in the reference group had a range of 1 in their scores.



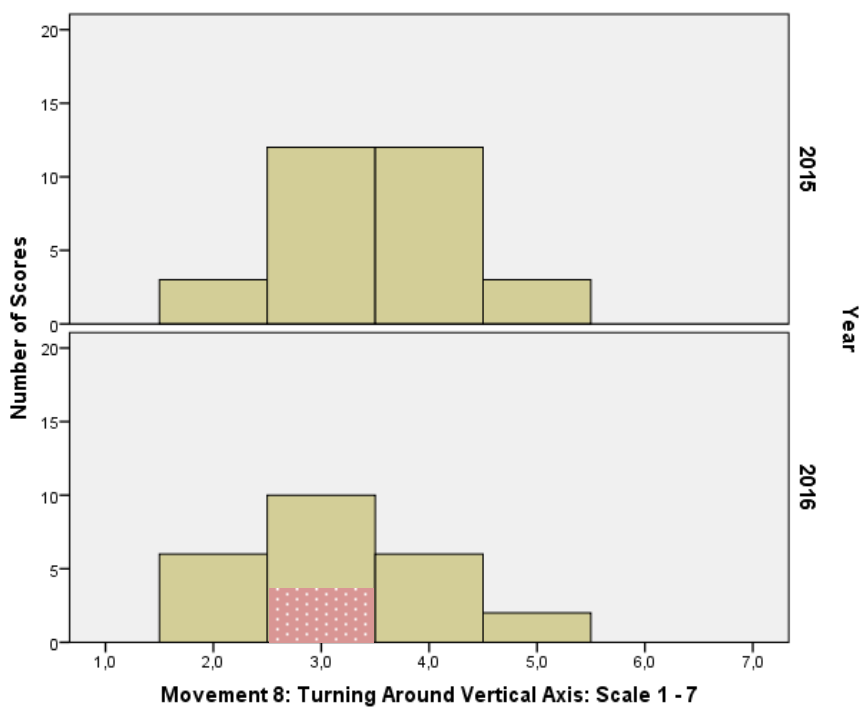
**Figure 13** Histogram of students' BARS scores in 2015 and 2016, Movement 7

Reference group's mode shown as dotted column

### 5.2.8 Movement 8: Turning Around Vertical Axis

In 2015, the students scored between 2 and 5 on the 1-7 point scale (Figure 14), with a range of 3 (Table 2). The mode was 4 and 90.0% of the students scored within the mode  $\pm 1$  score (Table 3).

In 2016, the mode was changed to 3, and more students scored within the mode  $\pm 1$  score (91.6%) (Table 3). Students and reference group had the same mode in 2016. The students' range was unaltered as 3 from 2015 to 2016, while the clinicians in the reference group had a range of 1 in their scores.



**Figure 14** Histogram of students' BARS scores in 2015 and 2016, Movement 8

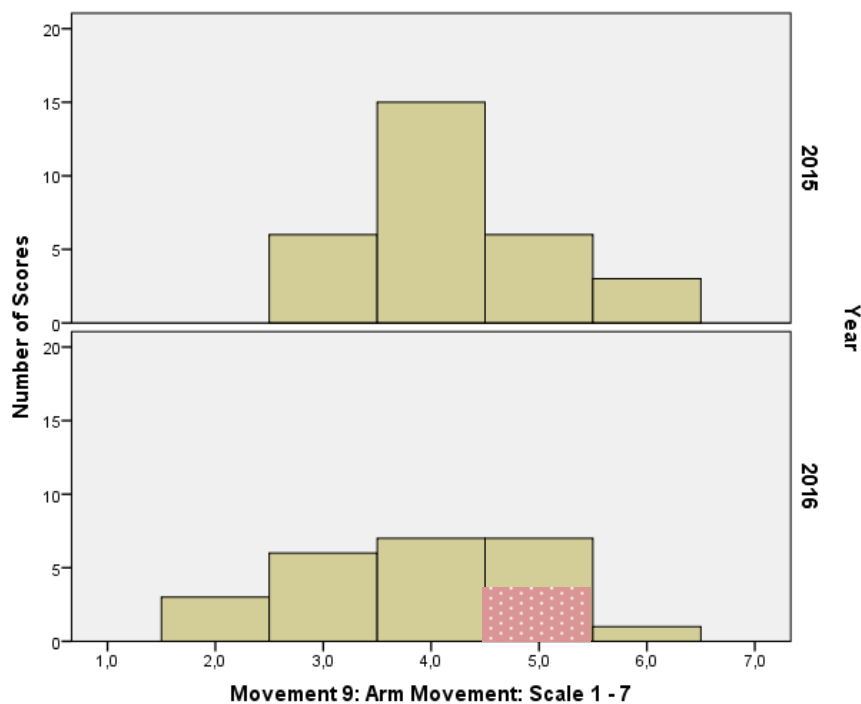
Reference group's mode shown as dotted column



### 5.2.9 Movement 9: Arm Movement

In 2015, the students scored between 3 and 6 on the 1-7 point scale (Figure 15), with a range of 3 (Table 2). The mode was 4, and 90.0% of the students scored within the mode  $\pm 1$  score (Table 3).

In 2016, the mode was changed to 5, and less students scored within the mode  $\pm 1$  score (62.5%) (Table 3). Students and reference group had the same mode in 2016 (Figure 15). The range increased to 4, and the students scored between 2 and 6. The clinicians in the reference group had a range of 1 in their scores.



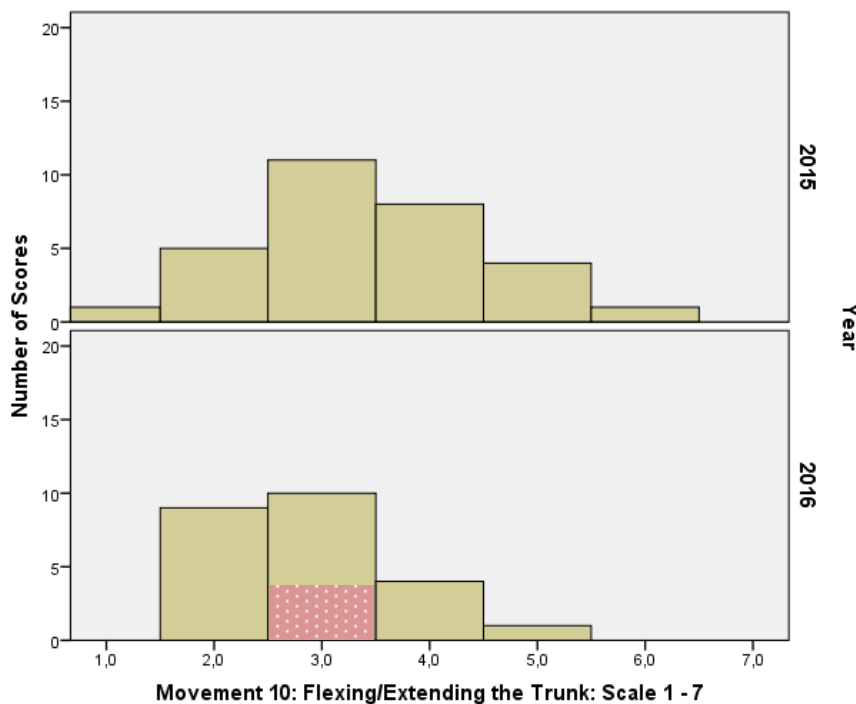
**Figure 15** Histogram of students' BARS scores in 2015 and 2016, Movement 9

Reference group's mode shown as dotted column

### 5.2.10 Movement 10: Flexing/Extending the Trunk

In 2015, the students scored between 1 and 6 on the 1-7 point scale (Figure 16), with a range of 5 (Table 2). The mode was 3 and 80.0% of the students scored within the mode  $\pm 1$  score (Table 3).

In 2016, the mode was unaltered as 3 and more students scored within the mode  $\pm 1$  score (95.8%) (Table 3). Students and reference group had the same mode in 2016 (Figure 16). The range decreased to 3, and the students scored between 2 and 5. The clinicians in the reference group had no variability in their scores.



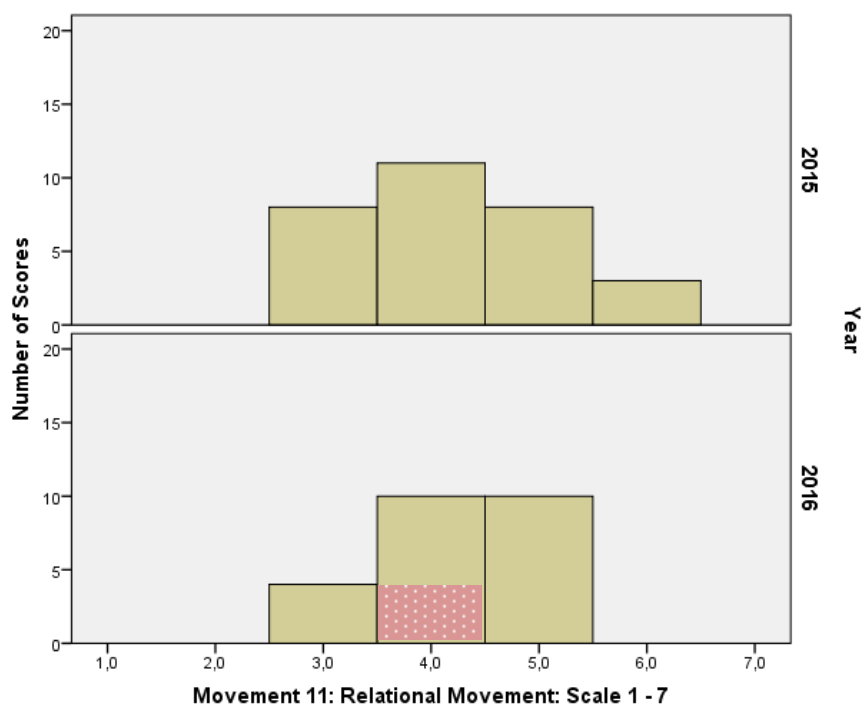
**Figure 16** Histogram of students' BARS scores in 2015 and 2016, Movement 10

Reference group's mode shown as dotted column

### 5.2.11 Movement 11: Relational Movement

In 2015, the students scored between 3 and 6 on the 1-7 point scale (Figure 17), with a range of 3 (Table 2). The mode was 4 and 90.0% of the students scored within the mode  $\pm 1$  score (Table 3).

In 2016, the mode was changed to 5 and less students scored within the mode  $\pm 1$  score (83.3%) (Table 3), while the reference groups' mode was 4 (Figure 17). The range decreased to 2, and the students scored between 3 and 5. The clinicians in the reference group had a range of 1 in their scores.



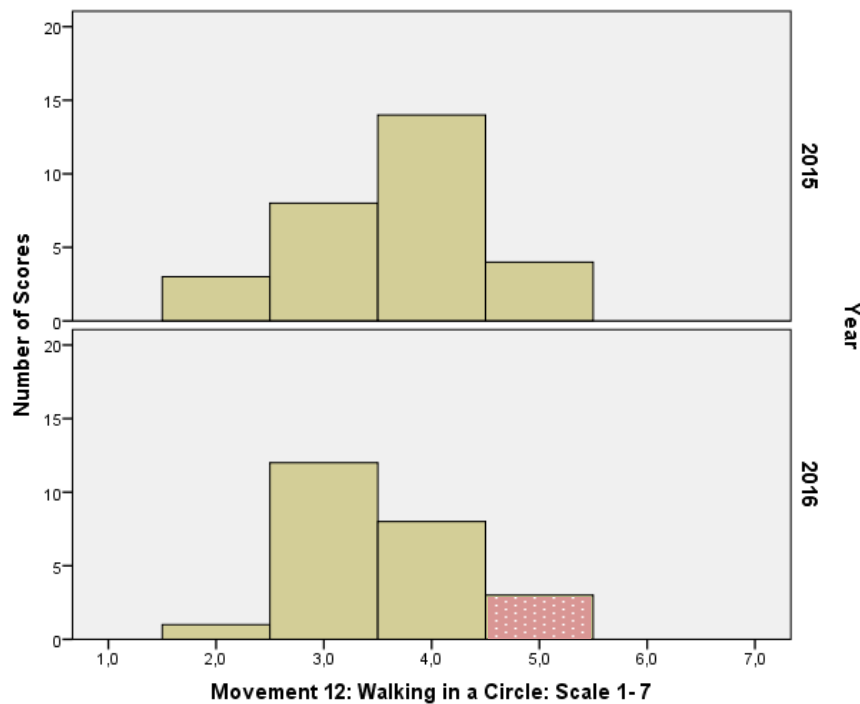
**Figure 17** Histogram of students' BARS scores in 2015 and 2016, Movement 11

Reference group's mode shown as dotted column

### 5.2.12 Movement 12: Walking in a Circle

In 2015, the students scored between 2 and 5 on the 1-7 point scale (Figure 18), with a range of 3 (Table 2). The mode was 4 and 89.6% of the students scored within the mode  $\pm 1$  score (Table 3).













In 2016, the mode was changed to 3 and less students scored within the mode  $\pm 1$  score (87.5%) (Table 3), while the reference group's mode was 5 (Figure 18). The students' range was unaltered as 3 from 2015 to 2016, while the clinicians in the reference group had a range of 2 in their scores.



**Figure 18** Histogram of students' BARS scores in 2015 and 2016, Movement 12

Reference group's mode shown as dotted column

**Table 2** Range of item score of BBAM students and reference group 2015- 2016

BARS Movements	Range 2015 n=30	Range 2016 n=25*	Change in Range	Range of reference group
1: Contact with the Ground	2	3		0
2: Closing Legs Together	3	2		1
3: Symmetrical Stretching	4	2		1
4: Asymmetrical Stretching	3	1		0
5: Sitting Balance	3	3		1
6: Up-Down Along Vertical Axis	3	3		1
7: Sideways Movement	4	3		1
8: Turning Around Vertical Axis	3	3		1
9: Arm Movement	3	4		1
10: Flexing/Extending the Trunk	5	3		0
11: Relational Movement	3	2		1
12: Walking in a Circle	3	3		2

\*2 students scored only some of the items



Increased range from 2015 to 2016



Decreased range from 2015 to 2016



Unaltered range from 2015 to 2016

**Table 3** Mode  $\pm 1$  2015 and 2016

BARS Movements	Mode 2015 (% within $\pm 1$ )	Mode 2016 (% within $\pm 1$ )	Mode reference group	Change in % within mode $\pm 1$ from 2015 to 2016
1: Contact with the ground	6 (93.3%)	5 (95.8%)	4	↑
2: Closing Legs Together	4 (90.0%)	3 (100.0%)	3	↑
3: Symmetrical Stretching	4 (89.6%)	3 (100.0%)	3	↑
4: Asymmetrical Stretching	3 (96.6%)	2 (100.0%)	2	↑
5: Sitting Balance	3 (96.6%)	3 (96.0%)	3	↓
6: Up-Down Along Vertical Axis	4 (80.0%)	4 (83.3%)	4	↑
7: Sideways Movement	4 (86.6%)	3 (83.3%)	4	↓
8: Turning Around Vertical Axis	4 (90.0%)	3 (91.6%)	3	↑
9: Arm Movement	4 (90.0%)	5 (62.5%)	5	↓
10: Flexing/Extending the Trunk	3 (80.0%)	3 (95.8%)	3	↑
11: Relational Movement	4 (90.0%)	5 (83.3%)	4	↓
12: Walking in a Circle	4 (89.6%)	3 (87.5%)	5	↓



↑ Increased per cent scoring within mode  $\pm 1$  score

↓ Decreased per cent scoring within mode  $\pm 1$  score

## 6 DISCUSSION

There is a general agreement that the process of clinical decision making in physiotherapy begins with anamnesis and observation. What to observe when it comes to movement analysis, and how to observe, is a skill that evolves as a result of experience and a learning process. This study focused on how learning to observe, describe and score movement quality as a skill evolves in terms of less variability and more concordance in scores among students of the BBAM programme. Research studies have shown that observational practice reduces variability in scores by reducing variability in personal interpretation (Haidet, Tate, Divirgilio-Thomas, Kolanowski, & Happ, 2009, p. 468). According to Polit and Beck (2012, p. 331) reduced variation in an evaluation implies higher reliability. The study is as such exploring the inter-rater reliability of the observations made of one client at each of two test-points, in 2015 and 2016.

30 post-graduate students from 15 countries and 4 continents were invited to observe and score a video-recorded client using BARS-MQE. We expected that the students' learning process was reflected in the movement quality scores, after scoring the same video-recorded client before and after a year of study. Postgraduate students were expected to having prior skills of observing general movement and function through their undergraduate studies and clinical practice. BARS-MQE introduces the students to a new way of observing movement and function by observing the whole moving person, focusing on the process and the healthy aspects expressed in the movement coordinations. As hypothesized, the group's evaluation of movement quality mostly improved in terms of less variability and more concordance in scores after the first year of BBAM studies, moving closer to the scores of the reference group, suggesting validity of their scores.

## 6.1 Discussion of results

All movement items from BARS-MQE demonstrated, as expected, variability in scores by the group of 30 students at the start of the BBAM study in 2015. Variability and concordance could, however, be considered reasonably good when a score was within  $\pm 1$  of the mode. The range varied between 2 and 5 in 2015. Only Movement 1: *Contact with the Ground* demonstrated a range of 2; however, the mode differed with two scores from that of the reference group. Most movement items (8 out of 12) demonstrated a range in scores of 3, while the mode was the same as for the reference group in five movement items.

Movement 3: *Symmetrical Stretching* and Movement 7: *Sideways Movement* demonstrated a range of 4, indicating large variability; however, the mode was the same as for the reference group in Movement 7. The largest variability in scores with a range of 5 was demonstrated for Movement 10: *Flexing/Extending the Trunk*, but the mode was the same as in the reference group.

After one year of BBAM study the students had improved their movement quality scores on BARS-MQE in relation to the reference group, with concordance of mode in eight movement items. The range varied between 1 and 4 in 2016. In four movement items the range in scores was 2 or less, and the modes were the same as those of the reference group in three of those movement items (Movement 2: *Closing Legs Together*, Movement 3: *Symmetrical Stretching*, and Movement 4: *Asymmetrical Stretching*). Out of seven movement items with a range of 3, five demonstrated concordance in modes with the reference group, while two did not. Movement 1: *Contact with the Ground* and 9: *Arm Movement* demonstrated increased variability in scores, reflecting uncertainty by the students of how to score.

After a learning process of 1 year, the longitudinal data showed a decrease in range in six movements (2: *Closing Legs Together*, 3: *Symmetrical Stretching*, 4: *Asymmetrical Stretching*, 7: *Sideways Movement*, 10: *Flexing/Extending the Trunk*, and 11: *Relational Movement*), and four of these demonstrated a concordance of mode with the reference group (except: 7: *Sideways Movement*, and 11: *Relational Movement*). Four items had an unaltered range (5:



*Sitting Balance*, 5: *Up/down along the Vertical Axis*, 8: *Turning Around the Vertical Axis*, and 12: *Walking in a Circle*), however, all of which had mode in concordance with the reference group, except Movement 12 (*Walking in a Circle*). Despite discordance of mode in four movements, we see that discordance occurred in the movements with multiple modes, either in the students' scores or in the scores of the reference group (Movement 1: *Contact with the Ground*, Movement 7: *Sideways Movement*, Movement 11: *Relational Movement*, Movement 12: *Walking in a Circle*). This is therefore not considered a major threat to validity. The decreased range after one year indicates a decrease in variability of observed movement quality from 2015 to 2016 in most items. The scores become more similar after one year of practice. The resulting increased concordance in eight movement items, and increased per cent scoring within mode  $\pm 1$  in seven movements, support an improved interrater reliability in the students' general observations of movement quality.

Despite a decrease in range, implying reliability in scores, there were a few exceptions to this conclusion. In movement 1 (*Contact with the Ground*) and movement 9 (*Arm Movement*) there was an increase in range from 2015 to 2016. In movement 9 (*Arm Movement*), there was also a reduction of nearly 30% of the students scoring within the  $\pm 1$  mode score. This indicates more variability and less similarity, despite concordance between the mode of the reference group and the students. However, the students had a multiple mode of 4 and 5, as well as a large group of students scoring 3. If the choice of mode had been 4 instead of 5, a larger group of students (83%) would have scored within the mode  $\pm 1$  score. This would, however, not change the range. The reference group only had a range of 1. A possible explanation of this finding could be the complexity of the movement which requires a certain level of practical experience. The complexity in this movement is found in the coordination of upper/lower body, rhythm, intention, and movement deriving from the centre.

In movement 1 (*Contact with the Ground*) the students and the reference group had different modes. The reference group's mode was 4, and the students' mode decreased from 6 to 5. The discordance of mode and the increased range, indicating more variability

and less similarity, threatens the validity of the score. There could be several explanations to this finding. The aim of this movement is for the client to search for irregularities in breathing, searching to free her breathing, when giving in to gravity (Skjærven, 2015). The therapist observes and guides the patient in this process. As the students are scoring a client on a video-recording, there is a quite large distance from the students to the client on the video, as opposed to a live-setting where the therapist is placed not more than one meter from the client. The movement to be observed is very subtle, and may be difficult to capture. Last, the students are observing the client from a diagonal perspective. However, all of these obstacles are applicable to the reference group as well. So, this could not fully explain the increased range and discordance of mode. Another possible explanation is that the students are still in a learning process, and not as experienced with BARS-MQE and BBAT as the reference group.

However, in this movement more students scored within the  $\pm 1$  mode score. In addition, the students had two modes: 4 and 5. In accordance with the decision to pick the highest score of mode, the reference group mode and the student mode became different. If this had not been taken into consideration the reference group and the student group would have similar mode. So, despite an increased range which differed from the range of the reference group, one of the students' modes was in concordance with the reference group. This implies no major threat to the validity of the scores. This shows that the students are in a learning process. One could, however, question the value of movement 1 (*Contact with the Ground*) in BARS-MQE. Besides, the rating scale could be reduced to fewer items, a view that is supported by the study of Skjærven et al. (2015). They examined reliability and validity of BARS-MQE, and found highly satisfactory internal consistency. A rating scale containing fewer items would make the test more feasible in clinical use.

The hypothesis was that students will improve their ability to observe and evaluate movement quality over time, and obtain more similar scores to those of a reference group of experienced clinicians. Considering each movement item separately, one could see that the range differs from the reference group in all movements, both in 2015 and 2016, as shown

in Table 2. As the mean of the students' sum score and the range of scores in 2016 came closer to the clinicians' scores, the expectations of more similar scores compared to the reference group was confirmed, and as such construct validity was supported.

The students' mean sum score decreased from 2015 to 2016, and the change in mean sum score was statistically significant. The mode was reduced in ten movement items. This was an unexpected finding, as it indicates an evaluation of movement quality as less functional in 2016. An important question is whether the learning process enables the students to observe less resources and health as they evaluate the movement quality as less functional. One could assume that the learning process has improved the students' movement awareness, and have refined their acumen to evaluate movement quality, resulting in a more stringent evaluation. This finding is supported by the reference group's evaluation of movement quality as even less functional. They are even more experienced and are expected to have higher movement awareness compared to the students.

This investigation shows that the evaluation of movement quality improved in terms of less variability and more concordance in scores after the first year of BBAM studies, moving closer to the scores of the reference group. These findings demonstrate that learning fosters improved understanding and precision in the evaluation of movement quality. It is, however, important to consider that the students are only half way through their studies – they are still in a learning process. One could therefore expect further improvement in terms of less variability and concordance with the reference group.

## **6.2 Discussion of method**

There are several aspects to explore in order to confirm or refute the validity of the study. In this chapter I will discuss methods used to answer the research questions of the present study. The discussion is organized within the subheadings internal validity and external validity. Internal validity refers to “the extent to which it is possible to make an inference that the independent variable, rather than another factor, is truly causing the variation in the dependent variable” (Polit & Beck, 2012, p. 244). External validity concerns whether relationship observed with a study sample can be generalized to settings or samples other than the one studied (Polit & Beck, 2012). Internal validity becomes a prerequisite for external validity.

### **6.2.1 Internal validity**

#### **6.2.1.1 One evaluated person**

In this investigation one single person was the object of evaluation. Selection bias in relation to the client could threaten the internal validity of the study. The client on the videotape had no known illness, and demonstrated rather functional movement quality. A client with good functional or dysfunctional movement quality could have caused different results in terms of variability and concordance/discordance of mode.

However, the number of raters was relatively high: 30 in 2015 and 23 in 2016. This strengthens the study as the described variation in scores is based on many observations of one evaluated person.

#### **6.2.1.2 The BBAT therapist**

The BBAT therapist guiding the client in the video-recording was an experienced physiotherapist within BBAT. The physiotherapist followed the standardized English BARS-MQE procedure/protocol in guiding and placement. The client was fluent in English, and the

guidance in English did not prevent the client from understanding the task. Adequate guiding by the BBAT therapist was important for the client's performance, but did not affect the students' ability to observe and score the demonstrated movement quality.

However, a different physiotherapist could have promoted more or less movement resources in the client, thereby affecting the observed movement quality.

### **6.2.1.3 The students as observers**

By representing four different continents and 15 different countries the BBAM students reflect The World Confederations for Physical Therapy's (WCPT's) recognition of education of physiotherapists taking place in very diverse, social, cultural, economic and political environments throughout the world (World Confederation for Physical Therapy, 2011). This diversity is assumed to affect what and how the students observe movement. How and what we observe are affected by prior knowledge and traditions, clinical experience and assumptions.

Physiotherapy in mental health traditionally has strong traditions in the Northern part of Europe, but is not so well established in other parts of the world. Also, as the phenomenon of movement quality promoted through movement awareness is not given much attention in physiotherapy education (Skjærven et al., 2010), one could have expected more variability in scores, at least at the beginning of the study.

The students had a mean 12 years of experience, with a range of 28 years (min 2 – max 30, data from 15 students). Despite many years of experience as physiotherapists, they were still novices within the field of BBAM. This might cause the student to discredit her/his own abilities, fearing norms or possibly interfering established relationships. When scoring movement quality, the lack of confidence in own abilities – or lack of knowledge of how to score movement quality or what the scores represent – could be a reason for clustered scores – not risking using the scale. Some students may on the other hand have a strong

need to claim own thoughts or ideas. This can result in one movement being scored as 1 (Dysfunctional movement quality) and 6 (Good functional movement quality), resulting in a range of five, dropping to three after a year of practice (Movement 10: *Flexing/Extending the Trunk*).

The overall results matched the hypothesis of less variability and more concordance in the ability to observe and describe movement quality; one could therefore assume the intervention caused the variation in the dependent variable of BARS-MQE. On the other hand, one could ponder upon whether the group was selected; the students enrolling to the BBAM programme may have a particular interest in human movement from a four-perspective view, and movement awareness as a resource and basis for a person-centered approach.

#### **6.2.1.4 Use of reference group**

In this study, it was hypothesized that the students would improve their ability to observe, describe and score movement quality over time, and hence obtain more similar scores. Also, it was expected that the students would become more equal in their evaluations as compared to a reference group of experienced clinicians. The reference group represent a “gold standard” in the assessment and scoring of movement, a matter of construct validity. However, this “gold standard” can be questioned since the reference group consists of only four persons and some variability in scores was revealed.

#### **6.2.1.5 Use of video-recording**

The video-recording was shot in a traditional physiotherapy institute. The premises did not offer much space for unfolding movements, but represents, however, traditional working facilities for a physiotherapist. The premises could have affected the movement quality of the client through constricted movements, especially in Movement 12: *Walking in a Circle*.

Both the therapist and the client were in the camera frame throughout the video-recording. Also, the lighting conditions were satisfactory, not impeding the students' ability to observe the client. The sound quality was influenced by traffic background noise. This could impede the students' ability to hear the guidance of the therapist. However, the therapist used the standardized guidance from BARS-MQE protocol, and the guidance itself could not impede the students' ability to evaluate movement quality. One could question whether the background noise could affect the client's ability to capture the guidance and as such affect the movement quality; however, neither the therapist nor the client problematized this during the recording.

Observation from a video-recording may lead to a potential loss of the larger environmental context outside the view of the lens, which in turn could affect the client's movement quality. Next, the video-recording was shot in a static camera position, diagonally over the shoulder of the therapist, from the corner of the room. This did not give the students the same visual perspective as the BBAT therapist recorded on the video. Also, the distance from the client impeded the students' possibility to observe details, such as breathing.

Secondly, a video-recording provides a two-dimensional experience of the movements. The students could not observe the client from different positions, as they would in a "live-setting". This might also have led to a loss of valuable information.

Thirdly, and perhaps most important, the students were not "in movement" with the client. As discussed earlier, the perception is a valuable source when it comes to observation. Through perception the students would more easily have attained information of i.e. effort, or experienced the notion of projection. Watching a client on a video-recording will provide limited perceptual information.

Video technology offers important advantages to the scientist. The observation of a video-recording can be repeated. With repeated screening of the same video-recording, I could ensure that the changes in observational scores were due to a change in the students' ability to evaluate movement quality, and prevent that the client could be a source of bias.

In this study, the students were non-intervening observers. The advantage of non-intervening evaluation is that the observer can view movement with some degree of detachment and objectivity. As non-intervening evaluators, the students did not have to think of guidance, being distracted by other concerns, or perceiving movement behavior and intervening in the on-going movement event. As novices this may be a challenge, and it could possibly impede the evaluation, and as such threaten internal validity. According to Moore and Yamamoto (2012, p. 157) the non-intervening evaluation is useful in the early stages of learning to observe and analyze movement.

#### **6.2.1.6 English language and movement terminology**

None of the students had English as their first language. A common language is a key for individual learning and reflection. In order to share knowledge and movement experiences with others, the tacit knowledge must be converted to explicit knowledge, through the use of a common language. As all tuition and curriculum at BBAM were given in English, and enrolment had a criterion of adequate English skills, some information or nuances in the terminology could have been lost in translation to their mother language. This could be an element influencing the incipient learning process, and as such threaten the internal validity.

According to Krogh, Ichijo, and Nonaka (2001, p. 39) it is decisive with a terminology known within groups. In BBAM there is established an English terminology of how to describe movement quality. If the students are not familiar with, or understand the terminology, this may affect their ability to describe movement quality. Establishing an acknowledged



terminology becomes important within BBAM, and important for reducing variability and increasing concordance of mode of observed movement quality scores.

The transmission of a common language and terminology takes place in practice and interaction. Reflection over practice and experience is hence important to establish a common vocabulary. If interaction with clients during the period of self-study involved guiding, describing and communicating in their first language, the familiarity with the English terminology would be postponed, and could as such have affect the longitudinal data.

An increased understanding of English language and English terminology could as such also be a factor influencing and explaining why the students evaluate movement quality as less functional after a year, and a possible factor explaining why the scores after a year have reduced variability and the modes are more in concordance with the reference group. In order to reduce language as a barrier, the students speaking the same language could have calibrated their understanding of the terminology at the beginning of the study, ensuring a common understanding of language and terminology, and as such reducing variability of observations made.

#### **6.2.1.7 Procedure of BARS-MQE**

In students with insufficient knowledge of what to observe, reliability may be compromised. This is a matter of internal validity. To increase the reliability of the observations, and as such increase the internal validity, the observation should according to Carter et al. (2011) be behaviorally defined and operationalized.

The movement quality scoring variables were well defined, and all the students were provided with the variables prior to both evaluations (Appendix 1). However, in order to recognize the health aspects in the movement quality described in the variables, it is a

precondition that the students comprehend and have embodied the procedures necessary to evaluate movement quality. This is done through movement awareness learning. Procedures are basically conceptual, explicit knowledge transformed from tacit knowledge through language.

Procedures represent the sum of all experience and successful solutions to a problem, and hence contribute to efficacy. Evaluating movement quality using BARS-MQE is performed efficiently if the procedures of how to structure the evaluation and how to evaluate movement quality using Movement Quality Model as a map or stepwise structure for observation is followed. However, Krogh et al. (2001, p. 40) describes procedures as a double-edged sword as they may also function as a constraint. The procedure or model may control the communication and restrain innovation as it presupposes skills and movement awareness. Movement awareness learning could also be considered a procedure, when following the steps described in the Movement Awareness Learning Cycle. If this learning process has not taken place, the students may lack a comprehension of movement quality as a general and unifying phenomenon. This may prevent the student from seeing the whole moving person, and the health aspects of movement quality. In BARS MQE some find it challenging to see the total coordination or unity. They observe body parts and what the client cannot do (pathology), and do not comprehend the concept or content described in the models or procedures. This is a relevant challenge at the beginning of a learning process, which can explain the variability at the time of the first data collection. Practicing procedures and the embodiment of movement awareness is a precondition to increased comprehension and improved evaluation of movement quality.

#### **6.2.1.8 The test situation**

None of the students were familiar with the phenomenon of movement quality as defined in BARS-MQE prior to enrolment in the BBAM study. The BBAM students had practiced direct observation of movement quality on each other through roleplay. Practical demonstrations of evaluation and scoring of selected items in BARS-MQE had been given, prior to evaluating

movement quality on a video-recorded client. The BARS-MQE variables had as such been reviewed, however, the students had not been presented with visual examples of the scoring alternatives 1 to 7 for each movement item. One could speculate whether the students' apprehension of the content of the scores would have been improved, if they had also been presented with a training-DVD, visualizing clients with different scores within each item. A systematic use of a training-DVD showing different clients performing diverse movement qualities could also have enabled the students to recognize movement quality from a larger range of the rating scale. According to Polit and Beck (2012, p. 335) «the best means of enhancing reliability in observational studies, is through observer training». Subsequently one could consider this as an area of improvement in the BBAM education, in order to improve the students' ability to use BARS-MQE for movement quality evaluation.

The BARS-MQE evaluation was performed at the end of a day. This could be a potential source of measurement error. Transitory personal factors such as tiredness could also affect their ability to observe movement quality with acumen. The students did seem concentrated during the test situation. First-year students may find the time provided insufficient to process the observations, to reflect, and to put down on paper a description and score. This could also contribute to measurement error. Despite varying time in between each movement, it seemed like the students had sufficient time between each item to describe and evaluate the movements shown. To avoid time being a source of measurement error the students could have been provided with an observational checklist in order to capture all nuances in elements and aspects observed within the given time frame.

#### **6.2.1.9 External events**

History, as external event taking place concurrently to the independent variable, can traditionally threaten the internal validity. The movement awareness learning process at the BBAM study consisted of 11 months of self-study. One can assume that effort differs somewhat, and that restricted access to clinical training/patients can slow down the movement awareness learning process, and as such affect the internal validity.

Within the colloquium groups the sharing of movement experiences could affect validity. The colloquium groups could have maintained a high interrater reliability without providing meaningful, valid information – as evaluation of movement quality similar to the reference group.

#### **6.2.1.10 Attrition**

The risk of attrition becomes higher when there is a long time between the points of data collection (Polit & Beck, 2012). To reduce the rate of attrition, the second data collection should have taken place earlier, however, this could lead to organizational challenges, and other sources of bias. BBAM is a demanding study with 11 months of self-study. Out of 30 enrolled students in 2015, four students dropped out. On the BARS-MQE evaluation in 2016 one additional student did not take part in the evaluation, and two students scored only parts of the BARS-MQE. There can be many reasons for dropping out. The 2015 scores of the five students who did not participate in the evaluation in 2016 were analysed and found to be similar to those of the other students. In this investigation, the attrition was considered as random, and was as such not considered a source of bias.

#### **6.2.1.11 Instrumentation**

Instrumentation may occur if the data collectors, in this study the students, become more experienced and produce different results the second time. However, it was hypothesized that students evaluated movement quality more similarly after a learning process, and this would not affect the internal validity. On the other hand, if the students were bored and evaluated movement indifferently, it could have biased the result. However, this would assumedly have led to outliers, which was not the case in this study.

#### **6.2.1.12 Use of statistical analysis**

By analysing only one person the data analysis was limited. A descriptive and graphic method was chosen to illustrate the distribution of scores in the 12 movement items. The distribution of sum scores was examined with descriptive statistics, and illustrated by histograms.

The BARS-MQE scoring is based on a 7-step ordinal scale, from 1 to 7, including half (0.5) scores to make the scale more sensitive to nuances of change. In the phase of analysis, I chose to use only whole scores, i.e. 4 and 4.5 were clustered as 4. Such a finely divided scale with half (0.5) scores are mainly used in a therapy setting, and would have put too strict demands on the students' agreement. This choice could have concealed some nuances in the students' observations. The students were not informed about this prior to scoring, and they used also half-scores. Given this information beforehand they might have scored somewhat differently. Another implication of reducing the scale from 13 possible scores to 7 scores, is a scale less sensitive to change.

The analysis was based on scores from the students as a group. This may conceal individual scores which systematically and markedly differ from the rest. Analyzing individual scores could have made it possible to provide individual supervision, and as such improve the results.

#### **6.2.1.13 The structure of the BBAM study**

As previously described, the students have eleven months of self-study. This includes monthly assignments, personal training in BBAT movements and clinical practice, and colloquiums on Skype. Apart from this the students are on their own. It could possibly have reduced the variability of scores if the students had met at shorter time intervals, calibrating their movements, and sharing their experiences.

### **6.2.2 External validity**

An important question is whether the study results can be extrapolated to other student groups. It is assumed that the results of the present study are representative for at least BBAM students in general, if the same client is evaluated under the same circumstances. We expect that the results could be very closely replicated with a different student group another year, as the students would represent diversity in both demography and years of clinical practice, provided that the BBAM study did not change. This implies a conditioned external validity.

## 7 CONCLUSION

The purpose of this investigation was to explore whether students of the international, post-graduate study programme in physiotherapy, Basic Body Awareness Methodology (BBAM), improve their ability to observe, describe and score movement quality using BARS-MQE as an evaluation tool. The structure of the BBAM studies, and the learning process through tuition and self-studies was expected to influence the students' observational skills. It was hypothesized that the students would improve their ability to observe and score movement quality over time after a one year learning process, and hence obtain more similar scores. The students' scores at the time of the second data collection was also expected to be more in concordance with the reference group of skilled BARS-MQE clinicians, defining a "gold standard". The overall results match the hypothesis of less variability and more concordance in movement quality scores after a study period of one year. The students were found to evaluate the movement quality more similarly to the reference group in 2016 compared to 2015. By combining and blending skills, conceptual, experiential and self-regulative knowledge, all derived from movement experiences, the BBAM students acquire professional skills and competence. This positions them to evaluate movement quality in a structured way by using BARS-MQE. Whether the students' observational skills could be improved further, could be a subject for a future study.

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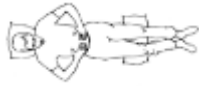



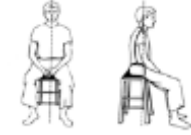

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**APPENDIX 1** Body Awareness Rating Scale (BARS) - Movement Quality Scores (Skjærven, 2015) Reprinted with permission

<b>MQ Score 7</b>	<i>Very good functional movement quality:</i> The vertical axis is very well balanced, stable, firm and free. Movement characteristics: Very good functional form, flow, elasticity and rhythm; a very good intentional clarity and direction in the movements. The amount of energy expressed in the movement is very appropriate to the task. The movements originate very clearly from the centre in the trunk. The movements in the person as a whole are simultaneous; they are congruent and in accordance with each other, and are characterized by very good unity and integration. They express <u>a very good movement harmony</u> .
<b>MQ Score 6</b>	<i>Good functional movement quality:</i> The vertical axis is well balanced, stable, firm and free. Movement characteristics: Good functional form, flow, elasticity and rhythm; a good intentional clarity and direction in the movements. The amount of energy expressed in the movement is appropriate to the task. The movements originate clearly from the centre in the trunk. The movements in the person as a whole are characterized by good unity and integration. They express <u>a good movement harmony</u> .
<b>MQ Score 5</b>	<i>Moderate functional movement quality:</i> The vertical axis is moderately well balanced, stable, firm and free. Movement characteristics: Moderate functional form, flow, elasticity and rhythm; a moderate clarity in the intention and direction of the movements. The amount of energy expressed is moderately appropriately to the task. There are moderate signs of movement originating from the center in the trunk. The movements are characterized by a moderate and variable amount of unity and integration. The movements in the person as a whole are characterized by moderate unity and integration. They express <u>moderate movement harmony</u> .
<b>MQ Score 4</b>	<i>Some functional movement quality:</i> The vertical axis has some balance, stability, firmness and freedom. Movement characteristics: Some glimpses of functional form, flow, elasticity and rhythm; some glimpses of intention and direction of the movements. The amount of energy expressed in the movement is somewhat appropriate to the task. There are some signs of movement originating from the centre in the trunk. The movements in the person as a whole are characterized by some glimpses of unity and integration. They express <u>some movement harmony</u> .
<b>MQ Score 3</b>	<i>Weak functional movement quality:</i> The vertical axis has an uncertain balance, little stability, firmness and freedom. Movement characteristics: somewhat dysfunctional in form, somewhat mechanical, staccato, stiff, a-rhythmical and lifeless. The movements are characterized by some weakness in the intention and direction. The amount of energy in the movement is more discordant with the task, being smaller and more closed or larger and more open or having too much or too little energy. The movements originate more from the periphery than from the centre in the trunk. The movements are characterized by a weak unity and integration. They express <u>weak movement harmony</u> .
<b>MQ Score 2</b>	<i>Mostly dysfunctional movement quality:</i> The vertical axis is mostly lacking balance, stability, firmness and freedom. Movement characteristics: Mostly dysfunctional form, staccato, mechanical, stiff, a-rhythmical, lifeless, mostly lacking elasticity. The movements are characterized by a mostly lacking intention and direction. The amount of energy in the movements is mostly in discord with the task, either being far too small and closed or far too large and open or using far too much or far too little energy. The movements originate mostly from the periphery. There is mostly a lack of unity between upper and lower body. The movements are mostly lacking unity and integration. They express a <u>lack of movement harmony</u> .
<b>MQ Score 1</b>	<i>Dysfunctional movement quality.</i> The vertical axis is unstable and fragmented. Movement characteristics: Dysfunctional form, staccato, mechanical, stiff, a-rhythmical, lifeless, lacking elasticity. The movement is characterized by lacking intention and direction. The movements originate from the periphery and are disconnected to each other. The movements in the whole person are in discord, incongruent and counteract each other. They express <u>movement disharmony</u> .

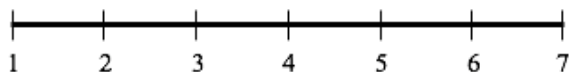
**APPENDIX 2** Physiotherapist's verbal guidance (Skjærven, 2015) Reprinted with permission

MOVEMENTS	The physiotherapist's verbal guidance of the movements in BARS
<b>No 1:</b> Contact with the Ground 	The therapist sits on the floor, facing the patient, at the level of the patient's waistline: <i>"Rest your hands lightly on your abdomen, between the navel and the breastbone, hands apart, fingers separated and elbows resting on the floor. You may close your eyes. Search to rest on the floor and give in to gravity, letting the breathing come and go just the way it is, without judging anything. Search for what is happening underneath your fingers without changing anything. Keep the mental contact, simply and naturally close to the area of your fingertips. Take time to come to rest, the breathing to find its place and to adjust to the situation"</i> .
<b>No 2: Closing</b> Legs Together 	<i>"Move your arms down, along the body. Take contact with the center of the body; search to initiate the movement from this region. Close your legs together in towards the vertical axis; let your thighs, knees, and ankles meet along the axis. Close your legs together - and drop, close - drop. Search for a light rhythmical continuity in the movement."</i> The sequence ends with moving the jaw from side to side, inviting yawning and natural stretching to come naturally.
<b>No 3:</b> Symmetrical Stretching 	<i>"Move your arms up above the head; take contact with the vertical axis. Lengthen both arms and legs slowly in opposite directions, like one long rubber band. Lengthen yourself as a whole from toes to fingers with a sense of being comfortable and at ease. Then search to release the tension. Repeat the sequence of stretch-release about 10 times in a comfortable rhythm: Long - drop, long - drop. Move your arms slowly down."</i> The sequence ends with moving the jaw, inviting yawning and natural stretching to come naturally.
<b>No 4:</b> Asymmetrical Stretching 	<i>"Move your arms up above the head; take contact with the vertical axis. Lengthen your whole right side, right leg and arm along the axis. After lengthening the right side, search to release the tension. Do the same on the left side. Search for the flow and rhythm in the movement when alternating the co-ordination of lengthening right and left side, and repeat the sequence of stretch - release about 10 times at a comfortable pace: right - drop, left - drop. Move your arms down"</i> . The sequence ends with moving the jaw, inviting yawning and stretching to come naturally.
<b>No 5:</b> Sitting Balance 	The therapist sits in front, little to the left so the patient's eyes rest above the therapist's shoulder: <i>"Sit on the front of the seat. Place your feet under your knees. Rest your hands naturally on your thighs, so the arms can relax without pulling you forward. Take contact with the whole body. You are now ready to explore gravity to find the optimal sitting balance, sideways, back and forth. Then lengthen your body upwards, from the seat to the top of the head, softly with as little tension as possible, as if to touch the ceiling with the top of your head; then release. Take support from the axis, as if an inner column is supporting you with minimal effort"</i> . Continue 10 times.
<b>No 6:</b> Up-Down Along the Vertical Axis 	The therapist stands in front and a little to the left of the patient, so the patient's eyes rest above the therapist's shoulder: <i>"Contact the vertical axis. Then flex your knees without lifting your heels from the ground. Move down the axis, effortlessly. Move up and down along the vertical axis, maintaining the upright, balanced position. Continue the up- down movement about 10</i>

	<i>times at a comfortable pace”.</i>
<b>No 7:</b> Sideways Movement 	<i>“Stand with your feet further apart. Contact the vertical axis. Flex knees and hips as if to sit on a high stool. Find a position where your knees are free, open and flexible without support from your arms. Move sideways, shifting the weight from the left to the right foot, search to keep a firm contact with the vertical axis. Keep your legs flexible and elastic to allow them to “absorb” the movement when continuing”.</i>
<b>No 8:</b> Turning around the Vertical Axis 	<i>“Stand with your feet underneath your hips, arms loose along your side. Contact the vertical axis, all joints free, allowing your breathing to find its own rhythm. Search from the center of your body to maintain contact with your whole body. Start turning from left to right – right to left – in a continuous movement, around the vertical axis. The movement involves the whole body from head to feet. Search for all parts of the body to start and end at the same time: head, trunk, pelvis, knees and ankles. The movements are not separate, but synchronous. Continue at a comfortable pace”.</i>
<b>No 9:</b> Arm-movement 	<i>“This is an elliptic arm movement in front of the body. Start to move your arms forward and up, to a little below shoulder level; then flex wrists, elbows and shoulders, lowering the arms closer to the body. Then move the arms forward and up. Let the movement develop into a unified elliptical wave. Gradually let the movement include your legs and knees, moving your whole body, up and down, along the vertical axis, down – up – down- up. Search for the breathing to join the movement. Continue at a comfortable pace”.</i>
<b>No 10:</b> Flexing-Extending the Trunk 	<i>“Contact your movement center and the vertical axis. Search for an upright, balanced, stable and free position. Let your body sink down, to close around the center, as if buckling along the vertical axis. Release the joints of the neck and the back while flexing knees and ankles. Search to find a relaxed position relative to gravity without disturbing the balance around the vertical axis. Move up along the axis, to regain the upright and free position. Continue the sequence, inviting the breathing to join the movement”.</i>
<b>No 11:</b> Relational Movement 	<i>The therapist stands in front of the patient, both with outstretched arms meeting at the fists. Therapist and patient are to move together. “We have found the distance between us; now drop your arms. Sink down along the vertical line, flexing the knees. We start to move together backward and forward, in the horizontal plane, searching for a common rhythm. Then flex the right elbow, letting our right wrists meet lightly. As we move together our right arms are moving in a clockwise direction creating an elliptic shape, listening to each other. Shift to the other arm and direction”.</i>
<b>No 12:</b> Walking in a Circle 	<i>The patient and therapist stand in front of each other with a distance of 2-3 meter. Both turn to the left, starting to walk. The therapist introduces shifting directions in walking: “Let's walk in a circle. We will search for a comfortable pace, as free as possible. Search for flow and rhythm in walking as if being carried by a river. We are, both of us, on this river. Search for your legs to be loose at the hips, feet like soft rolling wheels. After a while we change direction turning, to move in the opposite direction. When the speed and rhythm is stable in walking, focus on the vertical axis for a while, and then return your attention to walking like one rolling wheel.”</i>

## BODY AWARENESS RATING SCALE

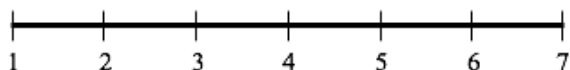
### 1: LYING, *Contact to the ground*



COMMENTS by PT:

PATIENTS DESCRIPTIONS:

### 2: LYING, *Closing legs together*



COMMENTS by PT:

PATIENTS DESCRIPTIONS: